MITSUBISHI ELECTRIC

Mitsubishi Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R Serial Communication Module User's Manual (Startup)

-RJ71C24
-RJ71C24-R2
-RJ71C24-R4

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning.
  (2) The programmable controller stops its operation upon detection of the following status, and the output status of the system will be as shown below.
    • Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
    • Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
  (3) Also, all outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module COnfiguration Manual.
  (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

[Design Precautions]

⚠WARNING

- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Failure to do so may result in an accident due to an incorrect output or malfunction.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.

[Precautions for using digital-analog converter modules]

- Analog outputs may remain on due to a failure of the module. Configure an external interlock circuit for output signals that could cause a serious accident.

[Precautions for using high-speed counter modules]

- Outputs may remain on or off due to a failure of a transistor for external output. Configure an external circuit for monitoring output signals that could cause a serious accident.

[Precautions for using positioning modules and Simple Motion modules]

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Machine OPR (Original Point Return) is controlled by two kinds of data: an OPR direction and an OPR speed. Deceleration starts when the near-point dog signal turns on. If an incorrect OPR direction is set, motion control may continue without deceleration. To prevent machine damage caused by this, configure an interlock circuit external to the programmable controller.
  (2) When the positioning module detects an error, the motion slows down and stops or the motion suddenly stops, depending on the stop group setting in parameter. Set the parameter to meet the specifications of a positioning control system. In addition, set the OPR parameter and positioning data within the specified setting range.
  (3) Outputs may remain on or off, or become undefined due to a failure of a component such as an insulation element and transistor in an output circuit, where the positioning module cannot detect any error. In a system that the incorrect output could cause a serious accident, configure an external circuit for monitoring output signals.
- An absolute position restoration by the positioning modules may turn off the servo-on signal (servo off) for approximately 60ms + scan time, and the motor may run unexpectedly. If this causes a problem, provide an electromagnetic brake to lock the motor during absolute position restoration.

[Design Precautions]

⚠WARNING

[Precautions for using Motion CPU modules and Simple Motion modules]

- If safety standards (ex., robot safety rules, etc.,) apply to the system using the module, servo amplifier and servo motor, make sure that the safety standards are satisfied.
- Construct a safety circuit externally of the module or servo amplifier if the abnormal operation of the module or servo amplifier differs from the safety directive operation in the system.

[Precautions for using CC-Link IE Controller Network (when optical fiber cables are used)]

- The optical transmitter and receiver of the CC-Link IE Controller Network module use laser diodes (class 1 in accordance with IEC 60825-1). Do not look directly at a laser beam. Doing so may harm your eyes.

[Precautions for using CC-Link system master/local modules]

- To set a refresh device in the module parameters, select the device Y for the remote output (RY) refresh device. If a device other than Y, such as M and L, is selected, the CPU module holds the device status even after its status is changed to STOP. For how to stop data link, refer to the MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application).

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or do not reset the CPU module during the setting registration. Doing so will make the data in the flash ROM undefined. The data need to be set in the buffer memory and to be written to the flash ROM again. Doing so may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as remote RUN/STOP), select "Do Not Open by Program" for "Opening Method" in the module parameters. If "Open by Program" is selected, an execution of remote STOP causes the communication line to close. Consequently, the CPU module cannot reopen the communication line, and external devices cannot execute the remote RUN.

[Precautions for using digital-analog converter modules]

- Power on or off the external power supply while the programmable controller is on. Failure to do so may result in incorrect output or malfunction.
- At power-on, a voltage may be applied or a current may flow between output terminals for a moment. In this case, start the control after analog outputs become stable.

[Precautions for using high-speed counter modules]

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm or more between them. Failure to do so may result in malfunction due to noise.

[Installation Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in an environment that meets general specifications written in Safety Guidelines included in the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect mounting may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause incorrect input or output.
- When using an SD memory card, fully insert it into the memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette into the cassette connector of a CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, or connector. Doing so may cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or damage to the product.
- After installation and wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices or coaxial cables must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. Do not clamp the extension cables with the jacket stripped.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.

[Wiring Precautions]

⚠CAUTION

- Mitsubishi programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Precautions for using high-speed counter modules]

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm or more between them. Failure to do so may result in malfunction due to noise.
- Ground the shield cable on the encoder side (relay box) with a ground resistance of 100Ω or less. Failure to do so may cause malfunction.

[Precautions for using CC-Link IE Controller Network (when optical fiber cables are used)]

- For optical fiber cables to be used in the system, select the ones that meet the specifications in the MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup). If not, normal data transmission is not guaranteed.

[Precautions for using CC-Link system master/local modules]

- Use Ver.1.10-compatible CC-Link dedicated cables in a CC-Link system. If not, the performance of the CC-Link system is not guaranteed. For the station-to-station cable length and the maximum overall cable length, follow the specifications in the MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Startup). If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so may cause the battery to generate heat, explode, ignite, or leak, resulting in injury or fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module, and do not insert/remove the extended SRAM cassette to/from the CPU module more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit of 50 times may cause malfunction.
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure.
- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette. Doing so may cause malfunction or failure.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.

[Startup and Maintenance Precautions]

⚠CAUTION

- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Precautions for using positioning modules, Motion CPU modules, and Simple Motion modules]

- Before testing the operation, set a low speed value for the speed limit parameter so that the operation can be stopped immediately upon occurrence of a hazardous condition.
- Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.

[Precautions for using Motion CPU modules and Simple Motion modules]

- When using the absolute position system function, on starting up, and when the module or absolute value motor has been replaced, always perform a home position return.
- Before starting the operation, confirm the brake function.
- Do not perform a megger test (insulation resistance measurement) during inspection.
- After maintenance and inspections are completed, confirm that the position detection of the absolute position detection function is correct.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.

[Operating Precautions]

⚠CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so also can cause malfunction or failure of the module.

[Precautions for using positioning modules, Motion CPU modules, and Simple Motion modules]

- Note that when the reference axis speed is specified for interpolation operation, the speed of the partner axis (2nd, 3rd, or 4th axis) may exceed the speed limit value.
- Do not go near the machine during test operations or during operations such as teaching. Doing so may lead to injuries.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

[Transportation Precautions]

⚠CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

CONDITIONS OF USE FOR THE PRODUCT

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

INTRODUCTION

Thank you for purchasing the Mitsubishi MELSEC iQ-R series programmable controller.
This manual describes the performance specifications, procedures up to operation, wiring, and communication examples to use the module listed below. Before using the product, thoroughly read this manual and related manuals to develop full familiarity with the performance of MELSEC iQ-R series programmable controller to ensure correct use.
When applying the example programs introduced in this manual to an actual system, make sure to examine the applicability and confirm that it will not cause system control problems.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

Supported module

RJ71C24, RJ71C24-R2, RJ71C24-R4

COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES

Programmable controller system

When configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to the following manual.

- 📖 MELSEC iQ-R Module Configuration Manual
- 📖 Safety Guidelines (included in a base unit)

The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

Additional measures

No additional measures are necessary for the compliance of this product with EMC and Low Voltage Directives.

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RELATED MANUALS

User's manuals for the module

Manual name [manual number]	Description	Available form
MELSEC iQ-R Serial Communication Module User's Manual (Startup) [SH-081250ENG] (this manual)	Specifications, list of functions, procedures prior to operation, system configurations, wring, and data communication examples of Serial communication module	Print book e-Manual EPUB PDF
MELSEC iQ-R Serial Communication Module User's Manual (Application) [SH-081251ENG]	Functions, input/output signals, buffer memory, parameter setting, and trouble shooting of Serial communication module	Print book e-Manual EPUB PDF
MELSEC Communication Protocol Reference Manual [SH-080008]	Specifications, accessible range, message protocols, and functions of MELSEC Communication Protocol	Print book e-Manual EPUB PDF

The following detailed information is not included in this manual.

- General specification
- Usable CPU module and the number of modules can be connected
- Installation

For more detail information, refer to the following manual.

MELSEC iQ-R Module Configuration Manual

Point

e-Manual refers to the Mitsubishi FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.

TERMS

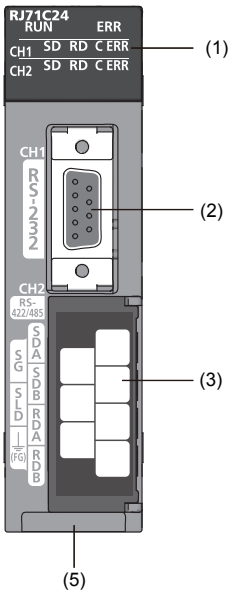
Unless otherwise specified, this manual uses the following terms.

Term	Description
CPU module	A generic term for MELSEC iQ-R series CPU module
C24	Another term for MELSEC iQ-R series Serial Communication Module
Intelligent function module	A generic term for modules which has functions other than input and output, such as A/D converter module and D/A converter module
Engineering tool	Another term for MELSEC programmable controller software packages
MC protocol	An abbreviation for MELSEC communication protocol, which is a name of communication method to access a CPU module form a target device using the communication procedure for Serial communication modules or Ethernet communication modules
3C frame (Format 1 to Format 4) 4C frame (Format 1 to Format 4)	A message format for C24 for data communications with ASCII code data using the MC protocol This is the same message format as the communication frame using the dedicated protocol for the QnA series Serial Communication Module. • QnA compatible 3C frame (Format 1 to 4): QnA frame (Format 1 to 4) • QnA compatible 4C frame (Format 1 to 4): QnA extension frame (Format 1 to 4)
4C frame (Format 5)	A message format for C24 for data communication with binary code data using the MC protocol This is the same message format as the communication frame using the dedicated protocol for the QnA series Serial Communication Module. • QnA compatible 4C frame (Format 5): QnA extension frame (Format 5)
Predefined protocol	A data communication function to send/receive data using a protocol of the target device for data communication between C24 and the target device This setting is configured with GX Works3 (the predefined protocol support function).
Predefined protocol support function	A function available using GX Works3 (the predefined protocol support function) The function includes the following: • Setting the protocol appropriate to respective target devices • Writing or reading the protocol setting data to/from CPU module or C24 • Debug support function
Nonprocedural protocol	A data communication function to communicate any data between a CPU module and the target device using user's communication procedure
Bidirectional protocol	A data communication function to communicate any data between a CPU module and the target device using the communication procedure for C24
Data communication function	A generic term for MC protocol, predefined protocol, nonprocedural protocol, and bidirectional protocol
Buffer memory	A memory of an Intelligent function module to store data (including setting value and monitored value) sent to/receive from CPU module
Packet	A data string used for communication with a target device by predefined protocol
Multidrop connection	A name of connection when more than one target devices or other C24s are connected on a 1:n basis or an m:n basis using the RS-422/485 interface of C24
User frame	A data name used to send/receive data by registering the fixed format part of messages to be sent/received between C24 and the target device to the module (The contents of a user frame data should conform to the specifications of the target device.) The data array of the head and tail sections in messages to be sent/received (transmission control code, C24 station number, sum check, fixed data, etc.) are registered to C24 respectively before use. This is used for the on-demand function of MC protocol and the data transmit/receive function by nonprocedural protocol.
Target device	A generic term for GOT, measuring instruments, ID modules, barcode readers, regulators, and other C24s connected to this C24 for data communication
Independent operation	A mode of interface operation to communicate data with the target device with a function specified in each communication protocol setting without interaction between two interfaces of C24
Interlink operation	A mode of interface operation to communicate data with the target device with the two interfaces linked one another when two interfaces of C24 are connected to target devices respectively The two interfaces communicate data with the same data communication function (MC protocol (identical format) or nonprocedural protocol) and the same transmission specifications. (Linked operation of the predefined protocol and the bidirectional protocol is not allowed.)

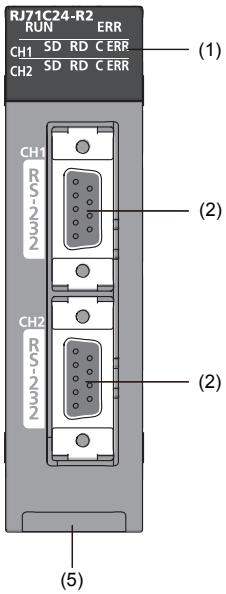
1 PART NAMES

This chapter explains the part names of C24.

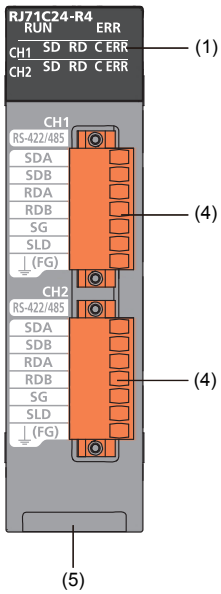
RJ71C24



RJ71C24-R2



RJ71C24-R4



No.	Name	Description
1)	RUN LED	Displays the operation status. ON: Normal OFF: Critical error occurred
	ERR LED*1	Displays the module error status. ON: Error has occurred*2, *3 Flashing: Parameter error occurred OFF: Normal
	SD LED	Displays the data transmission status. ON/Flashing: Data being transmitted OFF: Data not transmitted
	RD LED	Displays the data reception status. ON/Flashing: Data being received OFF: Data not received
	C ERR LED	Displays the communication error status. ON: Communication error has occurred OFF: Normal
2)	RS-232 interface	RS232 interface for serial communication with target devices (D-Sub 9 pin female (mating screw M2.6))
3)	RS-422/485 interface	RS422/485 interface for serial communication with target devices (2-piece terminal block)
4)	RS-422/485 interface	RS422/485 interface for serial communication with target devices (2-piece plug-in socket block)
5)	Production information display	Displays the production information (16 digits) of the module.

*1 For the LED display during hardware test or self-loopback test, refer to the following sections.
MELSEC iQ-R Serial Communication Module User's Manual (Application)

*2 This turns ON when an error occurs at C24 hardware or during data communication.
MELSEC iQ-R Serial Communication Module User's Manual (Application)

*3 Turning 'Error initialization request' (YE) ON turns the LED OFF.
However, the LED turns ON again if the error state is not cleared when 'Error initialization request' (YE) is turned OFF.

MEMO

2 SPECIFICATIONS

This chapter explains performance specifications, RS-232 interface specifications, RS-422/485 interface specifications, and modem specifications.

2.1 Performance Specifications

The following shows the C24 performance specifications.
For the transmission specifications when communicating via the modem function, refer to the following section.
☞ Page 30 Transmission specifications

Transmission specification

Item		Specifications		
		RJ71C24	RJ71C24-R2	RJ71C24-R4
Interface	CH1	RS-232-compliance (D-sub 9 pin female)	RS-232-compliance (D-sub 9 pin female)	RS-422/485-compliance (2-piece plug-in terminal block)
	CH2	RS-422/485-compliance (2-piece terminal block)	RS-232-compliance (D-sub 9 pin female)	RS-422/485-compliance (2-piece plug-in terminal block)
Communication method	Line	Full-duplex/half-duplex communications		
	MC protocol communication	Half-duplex communications		
	Predefined protocol communication	Full-duplex/half-duplex communications		
	Nonprocedural protocol communication	Full-duplex/half-duplex communications		
	Bidirectional protocol communication	Full-duplex/half-duplex communications		
Synchronization method		Start-stop synchronization method		
Transmission speed		1200/2400/4800/9600/14400/19200/28800/38400/57600/115200/230400(bps)		
Data format	Start bits	1		
	Data bits	7/8		
	Parity bits	1 (vertical parity) or none		
	Stop bits	1/2		
Access cycle	MC protocol communication	Processes one request during the END processing of the CPU module of the station with the C24.		
	Predefined protocol communication	Sends or receives data when requested with the dedicated instruction (CPRTCL).		
	Nonprocedural protocol communication Bidirectional protocol communication	Sends each time a send request is issued. Can receive at any time.		
Error detection				

	MC protocol communication	Predefined protocol communication	Nonprocedural protocol communication	Bidirectional protocol communication
Parity check	Enabled	Enabled	Enabled	Enabled
Sum check	Enabled	Enabled	Enabled	Enabled
Horizontal parity	Disabled	Enabled	Enabled	Disabled
16-bit CRC (for MODBUS)	Disabled	Enabled	Disabled	Disabled

- MC protocol communication: Select with parameters.
- Predefined protocol communication: Select with the Predefined protocol support function.
- Nonprocedural protocol communication: Set with user frames.
- Bidirectional protocol communication: Select with parameters.
- Parity check: Select odd/even of parity bit (vertical bit) with parameters.

<table>
<tr><th colspan="3" rowspan="2">Item</th><th colspan="3">Specifications</th></tr>
<tr><th>RJ71C24</th><th>RJ71C24-R2</th><th>RJ71C24-R4</th></tr>
<tr><td colspan="3">Transmission control</td><td colspan="3">
<table>
<tr><th></th><th>RS-232</th><th>RS-422/485</th></tr>
<tr><td>DTR/DSR control</td><td>Enabled</td><td>Disabled</td></tr>
<tr><td>RS/CS control</td><td>Enabled</td><td>Disabled</td></tr>
<tr><td>CD(DCD) signal control</td><td>Enabled</td><td>Disabled</td></tr>
<tr><td>DC1/DC3 (Xon/Xoff) control
DC2/DC4 control</td><td>Enabled</td><td>Enabled</td></tr>
</table>
• DTR/DSR signal control and DC code control are selected by the user.
</td></tr>
<tr><td rowspan="2">Line configuration for connection (Target device side: CPU module side)*1</td><td colspan="2">RS-232</td><td>1:1</td><td>1:1</td><td>—</td></tr>
<tr><td colspan="2">RS-422/485</td><td>1:1, 1:n, n:1, m:n</td><td>—</td><td>1:1, 1:n, n:1, m:n</td></tr>
<tr><td rowspan="8">Line configuration for data communication (Target device side: CPU module side)*1</td><td rowspan="4">RS-232</td><td>MC protocol communication</td><td>1:1</td><td>1:1</td><td>—</td></tr>
<tr><td>Predefined protocol communication</td><td>1:1</td><td>1:1</td><td></td></tr>
<tr><td>Nonprocedural protocol communication</td><td>1:1</td><td>1:1</td><td></td></tr>
<tr><td>Bidirectional protocol communication</td><td>1:1</td><td>1:1</td><td></td></tr>
<tr><td rowspan="4">RS-422/485</td><td>MC protocol communication</td><td>1:1, 1:n, m:n</td><td>—</td><td>1:1, 1:n, m:n</td></tr>
<tr><td>Predefined protocol communication</td><td>1:1, n:1</td><td></td><td>1:1, n:1</td></tr>
<tr><td>Nonprocedural protocol communication</td><td>1:1, 1:n, n:1</td><td></td><td>1:1, 1:n, n:1</td></tr>
<tr><td>Bidirectional protocol communication</td><td>1:1</td><td></td><td>1:1</td></tr>
<tr><td rowspan="2">Transmission distance (Overall distance)</td><td colspan="2">RS-232</td><td>Maximum 15 m</td><td>Maximum 15 m</td><td>—</td></tr>
<tr><td colspan="2">RS-422/485</td><td>Maximum 1200 m (overall distance)</td><td>—</td><td>Maximum 1200 m (overall distance)</td></tr>
<tr><td colspan="3">Number of occupied I/O points</td><td colspan="3">32 points (I/O assignment: Intelli: 32 points)</td></tr>
<tr><td colspan="3">Applicable connector for external wiring</td><td colspan="2">D-sub 9 pin (male) screw type*2</td><td>—</td></tr>
<tr><td colspan="3">5V DC internal current consumption</td><td>0.31 A</td><td>0.20 A</td><td>0.42 A</td></tr>
<tr><td colspan="3">External dimensions</td><td colspan="3">106(H) × 27.8(W) × 110(D)[mm]</td></tr>
<tr><td colspan="3">Weight</td><td>0.16 kg</td><td>0.14 kg</td><td>0.13 kg</td></tr>
</table>

*1 The total number of 'n' or 'm+n' is up to 32.

*2 For more information on recommended connectors, refer to the following section.

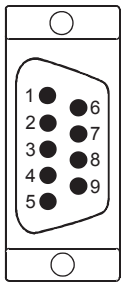
☞ Page 23 Interface connector

2.2 RS-232 Interface Specification

The following shows the RS-232 interface specifications.

RS-232 connector specifications

The following table shows the specifications of the RS-232 connector that connects C24 to a target device.

Connector	Pin number	Signal number	Signal name	Direction C24 ↔ target device
	1	CD(DCD)	Data carrier detect	←
	2	RD(RXD)	Receive data	←
	3	SD(TXD)	Send data	→
	4	ER(DTR)	Data terminal ready	→
	5	SG	Signal ground	↔
	6	DR(DSR)	Data set ready	←
	7	RS(RTS)	Request to send	→
	8	CS(CTS)	Clear to send	←
	9	CI(RI)	Ring indicator	←

Control signals

The following explains the control signals. (The pin numbers of the connector are enclosed in parentheses.)

■CD(DCD) signal (1)

• C24 operates according to the setting with the CD terminal check designation of C24.

	CD terminal check is enabled	CD terminal check is disabled
Full-duplex communication	• C24 performs the send and receive processing when the CD(DCD) signal is ON. • When the CD(DCD) signal is turned OFF during data communication, C24 initializes the transmission sequence.	• C24 performs the send and receive processing regardless of the ON/OFF status of the CD(DCD) signal. • Data communications is possible with a target device that cannot turn the CD(DCD) signal ON/OFF.
Half-duplex communication	MELSEC iQ-R Serial Communication Module User's Manual (Application)	Not applicable

Configure the setting of CD terminal check with the following setting items of Engineering tool.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Module Name ⇨ [Module Parameter] ⇨ "Basic Settings" ⇨ "Various control specification" ⇨ "Communication control specification" ⇨ "CD terminal check designation"

Restriction

When the CD terminal check is set to be enabled for full-duplex communications, set the CD signal of C24 in the ON state during data transmission.

• When the CD signal is turned OFF while data is being transmitted to the target device using the nonprocedural protocol, C24 stops the transmission, and turns ON the 'CH☐ Transmission normal completion' (X0/X7).

• If the CD signal is OFF when starting data transmission to the target device using the nonprocedural protocol, C24 does not transmit data, and turns ON the 'CH☐ Transmission normal completion' (X0/X7).

■RD(RXD) signal (2)

A signal to receive data

■SD(TXD) signal (3)

A signal to send data

■ER(DTR) signal (4)

- When communicating data using the nonprocedural protocol, C24 turns ON or OFF (ON when data is receivable) depending on the unused memory size in the OS area allocated for receive data storage, if DTR/DSR control is performed. Read the receive data from the program, as the receive data is stored in the OS area when the ER(DTR) signal is OFF. If DTR/DSR control is not performed, the ER(DTR) signal is always ON.
- When communicating data using the MC protocol or bidirectional protocol, C24 turns ON when communications is enabled.

■DR(DSR) signal (6)

- During DTR/DSR control, C24 does not send data to the target device when this signal is OFF. Be sure that this signal is always turned ON when the target device is ready to receive.
- If DTR/DSR control is not performed, the DR(DSR) signal status is ignored.

■RS(RTS) signal (7)

C24 turns ON/OFF the RS(RTS) signal as shown below depending on the communication method.

- When the communication method is full-duplex communications, if the 'C24 READY' (X1E) is ON, C24 turns ON the RS(RTS) signal.
- When the communication method is half-duplex communications, it turns ON the RS(RTS) signal when C24 sends data to a target device.
- The RS(RTS) signal is not turned OFF even when the receive data cannot be stored in C24.

■CS(CTS) signal (8)

- C24 does not send data to a target device when this signal is OFF.
- Be sure that this signal is always turned ON when the target device is ready to receive.

■CI(RI) signal (9)

- The CI(RI) signal is used when the modem status is monitored on C24 side. It should be connected as needed. The CI(RI) signal is not needed to be connected when the modem is not connected.

ON and OFF states of signal

The ON and OFF states of each signal indicate the following conditions:

	Output side	Input side
ON	5 VDC to 15 VCD	3 VDC to 15 VDC
OFF	-15 VDC to -5 VDC	-15 VDC to -3 VDC

Interface connector

The following connector model is used as RS-232 interface connector for C24.

- 9-pin D-sub (female) screw type (mating screw M2.6)
  17L-10090-27 (D9AC) (-FA)
  Manufactured by DDK Ltd.

The suitable connector shell for the RS-232 connector is as shown below.

Type	Model
Connector shell	17JE-23090-02(D8A)(-CG)*1

*1 Manufactured by DDK Ltd.

Tightening torque

For details on the tightening torque for the RS-232 interface connector, refer to the following section.

☞ Page 44 Considerations for connection

Remarks

■Confirmation of RS-232 control signal status

During data communication, the status of each control signal of ER(DTR), DR(DSR), RS(RTS), and CD(DCD) can be confirmed with 'RS-232 control signal status' (Un\G596/612).

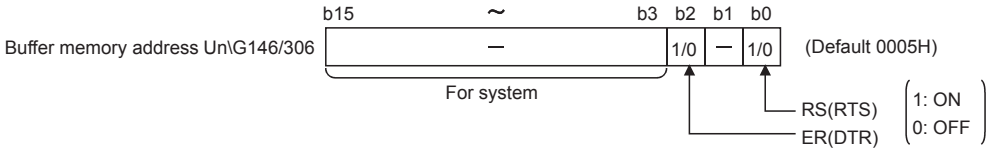
Bit position	Buffer memory address	
	CH1 side	CH2 side
	Un\G596	Un\G612
b0	RS(RTS)	
b1	DR(DSR)	
b2	ER(DTR)	
b3	CD(DCD)	
b4	CS(CTS)*1	
b5	CI(RI)	
b6 to b15	—	

*1 System area for RJ71C24 (-R2)

■RS and DTR signal status designation

Normally, C24 turns ON/OFF the RS(RTS) signal or ER(DTR) signal.

The ON/OFF status of the RS(RTS) or ER(DTR) signal can be specified by turning ON/OFF the corresponding bit in the 'RS and DTR signal status designation' (Un\G146/306). *1,*2,*3,*4



*1 The RS(RTS) signal is controlled by C24 in the following cases. (The setting contents are ignored.)
When data is communicated with half-duplex communication
When RS/CS control is performed during communication with the modem function

*2 The ER(DTR) signal is controlled by C24 in the following cases. (The setting contents are ignored.)
When the DTR/DSR signals are controlled
When data is communicated with the modem function

*3 After writing in the buffer memory, a lag of 0 to 20 ms occurs until it is reflected in the signal.

*4 When RS and DTR signal status designation (protocol No.: 204 to 207) for a functional protocol is performed with the CPRTCL instruction, the corresponding bit in the 'RS and DTR signal status designation' (Un\G146/306) turns ON or OFF.
For details on functional protocol, refer to the following manual.
MELSEC iQ-R Programming Manual (Instructions, Standard Functions/Function Blocks)

Restriction

Be sure to control the RS(RTS) and ER(DTR) signals with the C24 system.
Control of the RS(RTS) and ER(DTR) signals by a user may cause data communication errors.

RS-232 cable specification

Use a cable of 15 m (49.21ft) or shorter, which conforms to the RS-232 standard as the RS-232 cable.

Diameter	Type	Material	Temperature rating
AWG28 to 24	Stranded	Copper	60℃ or more

• Reference

Oki Electric Cable Co., Ltd.

7/0.127 □P HRV-SV

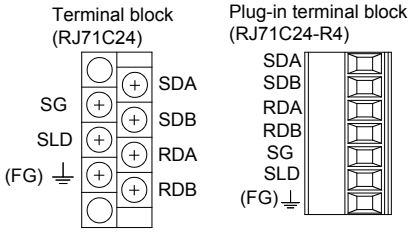
□: Specify the number of pairs. (For 13 pairs 7/0.127 13P HRV-SV)

2.3 RS-422/485 Interface Specifications

The following explains the RS-422/485 interface specifications.

RS-422/485 terminal block specifications

The following table shows the specifications of the RS-422/485 terminal block that connects to a target device.

Terminal block	Abbreviation	Signal name	Direction C24 ↔ Target device
	SDA	Transmitted data (+)	→
	SDB	Transmitted data (-)	→
	RDA	Received data (+)	←
	RDB	Received data (-)	←
	SG	Signal ground	↔
	SLD*1	Shield wire of cable	↔
	FG*1	Frame ground	↔

*1 The SLD and FG are connected inside the module.

Control signals

The following explains the control signals.

■SDA, SDB signals

Signals to send data from C24 to the target device.

■RDA, RDB signals

Signals for C24 to receive data from the target device.

Terminating resistor

For more information of terminating resistor connection, refer to the following section.

☞ Page 46 Considerations for connection

Terminal

■Terminal block (RJ71C24)

Use 1.25-3 for the solderless terminal to be attached on the terminal block.

Use the UL certified solderless terminal. For crimping the terminal, use the tools recommended by solderless terminal manufacturers. Solderless terminals with insulation sleeves cannot be used.

■Plug-in terminal block (RJ71C24-R4)

Remove the shielded part of the cable and directly connect the cable to the plug-in socket block.

Use the plate terminal (supplied with the product) to connect the braided shield wire to the FG terminal on the plug-in terminal block.

Tightening torque

For details on the tightening torque for the RS-422/485 terminal block, refer to the following section.

☞ Page 46 Considerations for connection

RS-422/485 cable specifications

The following table shows the RS-422/485 cable specifications.

- Use a cable of 1200 m (3937 ft.) or shorter, which satisfies the following specifications for the RS-422/485 cable (cable connected to the terminal block on C24).

Item	Description
Cable type	Shielded cable
Number of pairs	3P
Conductor resistance (20℃)	88.0Ω/km or less
Insulation resistance	10000MΩ-km or more
Dielectric strength	500 VDC, 1 minute
Electrostatic capacitance (1 kHz)	60nF/km or less on average
Characteristic impedance (100 kHz)	110±10Ω
Recommended conductor size	0.2㎟ to 0.75㎟
Diameter	AWG22 to AWG16
Type	Stranded
Material	Copper
Temperature rating	60℃ or more

- Recommended cable

Cable model	Manufacturer
HRZEV-ME(20276)AWG22×3P	DYDEN CORPORATION
SPEV(SB)-MPC-0.2×3P	MITSUBISHI CABLE INDUSTRIES, Ltd.
SPEV(SB)-0.2×3P	MITSUBISHI CABLE INDUSTRIES, Ltd.
SPEV(SB)-0.3×3P	MITSUBISHI CABLE INDUSTRIES, Ltd.

The recommended cables shown above have the same electrical characteristics, but external diameter and internal wire colors are slightly different.

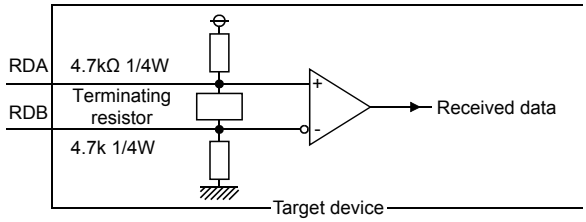
- Make the total distance within 1200 m (3937 ft.) when more than one device is connected on a 1:n, n:1, or m:n basis.

Considerations for data communication using RS-422/485 circuit

Take the following into consideration for data communication with a target device through the C24 RS-422/485 interface.
Take the following into account to send/receive data at the target device side.

Countermeasures against wrong data reception at a target device side

If a target device may receive erroneous data, install a pull-up or pull-down resistor to the target device side as follows.
Installing a pull-up or pull-down resistor (resistance value criteria: approx. 4.7kΩ1/4W) can prevent the reception of erroneous data.
When there is a pull-up or pull-down resistor on the target device, erroneous data is not received.



■Remarks

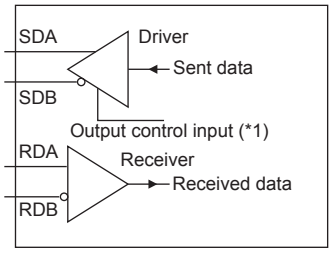
The following describes the case when a pull-up or pull-down resistor is not installed to a target device.
When no station is transmitting data, the transmission line becomes high impedance, and noise, etc. may make the line unstable and cause the target device to receive erroneous data.
In this case, probably a parity error or framing error occurs, therefore, skip the erroneous data.
Since the first data during data reception is fixed in the following cases, also skip the receive data until the fixed head data is received.

- When using the MC protocol for data communication, the first data is fixed according to the frame and format the user uses.
- When using user frames with the nonprocedural protocol or bidirectional protocol for data communication, the first data is determined according to the user frame registered to C24.

RS-422/485 interface operation

■RS-422-485 interface structure

The following diagram shows the structure of the C24 RS-422/485 interface driver (send)/receiver (receive).



*1 'Output control input' (also called send gate) of the driver (send) section of the illustration above determines whether or not data from SDA/SDB is output to the outside.

■RS-422/485 interface operation

When the 'Output control input' in the illustration above is ON, the interface enters the low impedance state (state in which data can be sent).

To the contrary, when the 'Output control input' is OFF, the interface enters the high impedance state (state in which data is not sent).

■Timing to start sending and to complete the transmission processing of C24

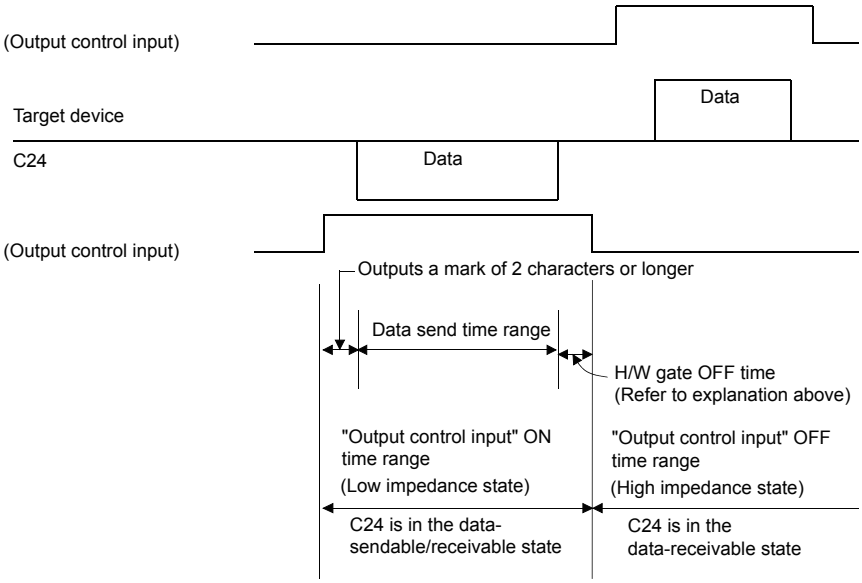
• Timing to start sending

During data transmission, C24 outputs the actual data after sending a mark of 2 characters or longer after the high impedance by the operations described above is reset.

• Transmission processing completion timing

The following time is required as hardware gate OFF time from the completion of data transmission to the completion of transmission processing (the state changes to the high impedance state). (This applies to the transmission speed set in C24.)

When the transmission speed is 1200 bps or higher: Data transfer time of less than 1 bit



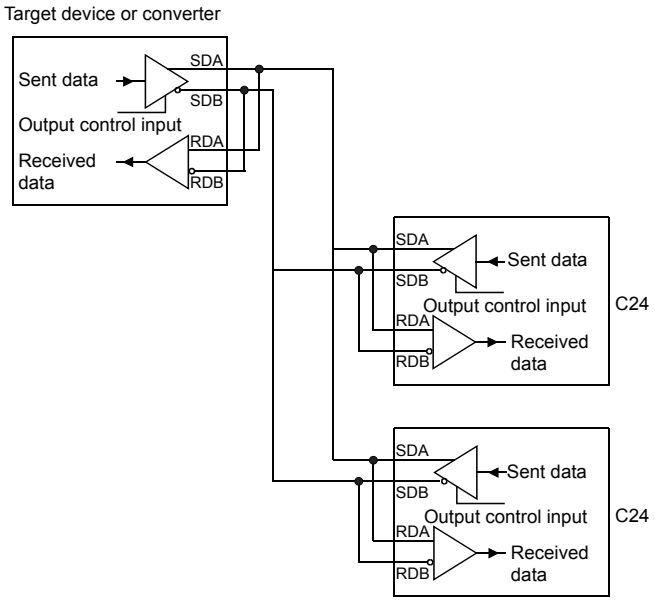
Precautions

• For multidrop connection

When the send signal of each device is connected as shown below, if the 'Output control input' is turned ON at two or more devices, the relevant devices output (send) data at the same time.

The target device side must turn ON the 'Output control input' only when sending data or must turn OFF the 'Output control input' when not sending data for the normal data communication.

The C24 side automatically controls the output control input.



• When two interfaces are in the interlink operation in C24, the transmission time for one character becomes equal to the hardware gate OFF time of C24. (C24 turns OFF the gate after the transmission time for one character following the data transmission.)

2.4 Modem Specification

This section explains the transmission specifications and connectable modem/TA (terminal adapter) specifications when using the modem function.

Transmission specifications

The transmission specifications on the C24 side for communication with the modem function are as shown below.
For the transmission specifications between C24 and a modem/TA (the C24 side on host station) that are not provided in this table, refer to the following section.
☞ Page 20 Transmission specification

Item		RJ71C24 RJ71C24-R2	RJ71C24-R4
Availability of modem function		Available	Not available
Interface that can use the modem function		RS-232	—
Interlink operation between CH1 and CH2 of C24		Not available	
Communication method		Full duplex communication	
Synchronization method		Asynchronous method	
Transmission speed		1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400(bps)	
Data format	Start bit	1	
	Data bit	7/8	
	Parity bit	1 (Exist)/0 (None)	
	Stop bit	1/2	
Error detection	Parity check	Yes (odd/even selectable)/None	
	Sum check code	Yes/None	
Transmission control		RS/CS control enabled/disabled (selectable)	
Availability of data communication	MC protocol*1	Available	
	Predefined protocol	Not available	
	Nonprocedural protocol	Available	
	Bidirectional protocol	Available	
Line connection (C24: modem)		1:1	

*1 Only data transmission with the on-demand function is available from CPU module to the target device.

Specification of connectable modems/TAs (terminal adapters)

The table below shows the specifications of modems/TAs that can be connected to the C24 side when the modem function is used.

Specifications of and considerations for the connectable modems

■Modem specification

Item			Specification		Remarks
			When using the public line/office telephone system	When using a manual line connection	
Modem-to-modem communication specifications	Connection line		Analog 2-line		—
	Initialization		Hayes AT command compatible		📖 MELSEC iQ-R Serial Communication Module User's Manual (Application)
	Telephone line		A line equivalent to NTT communication protocol		
	Communication standard	ITU-T	V.34/V.32bis/V.32/V.22bis/V.22/V.21/V.fc		—
		Bell	212A/103		
	Error correction	MNP	Class 4 and 10 compliant		
		ITU-T	V.42 compliant		
	Data compression	MNP	Class 5 compliant		
		ITU-T	V.42bis compliant		
	ANS-ORG mode switch		—	Capable of switching mode	
C24-to-modem communication specifications	C24 side connector (RS-232)		D-sub 9 pin (female)		☞ Page 20 Transmission specification
	DR signal control*1		Capable of turning ON the DR(DSR) signal only		—
	Other		Compatible with C24 specification		☞ Page 20 Transmission specification ☞ Page 30 Transmission specifications

*1 Modems which turn ON the CD(DCD) signal simultaneously cannot be used.

The following are the functions of the modem itself that become available by issuing the AT commands to the modem. For details, refer to the modem's instruction.

Item	Description
Error correction	When a noise occurs on the line, data corruption may occur due to interrupted communication data. The error correction function is intended to suppress effects from such noises.
	If an error such as data corruption is detected by the error correction function, the modem retries the transmission. When the number of retries has exceeded the modem's limit, the modem determines that it's under the environment where communication cannot be established.
	Both modems must support the MNP4 or V.42 protocol.
Data compression	This function compresses data to be sent prior to transmission, and decompress the compressed data upon reception, then forwards to the terminal.
	The data compression is effective for the execution speed at a maximum of 200 % for the MNP5 and 300 % for the V.42bis.
	Both modems must support the MNP5 or V.42bis protocol.
Flow control (RS/CS control)	When communication between a modem and terminal is faster than between two modems, the flow control is performed in the following order: • The modem transmits data to the target by storing the data from the terminal in the modem buffer. • When the buffer in the modem becomes almost full, the modem outputs a data transmission temporary stop request (CS(CTS) signal = OFF) to the terminal. The terminal pauses data transmission by the request. Even while the terminal pauses data transmission, the modem continues to send data to the partner. • When the buffer has free space, the modem outputs a data transmission resuming request (CS(CTS) signal = ON) to the terminal. The terminal resumes data transmission to the modem by the request.

■Considerations for selecting a modem

• Modem setting

Configure the setting as shown below for a modem to be connected to the C24 side

Setting item		Setting range
Communication rate		Depends on the modem in use*1
Modem command		Hayes AT command
SI/SO control		None
Communication method		Nonprocedural
Data format	Data bit	Match with C24*2, *3
	Stop bit	
	Parity bit	

*1 When using different modems, the slower communication rate will be in effect.

*2 Some modems may transmit one character as 10 bits.
Check the modem specifications when setting C24 transmission specifications.

*3 Some modems may switch the communication rate following the start of data communication.
Since C24 cannot switch the communication rate, set the modem side so that its communication rate does not switch.

When using a modem whose DR terminal (signal) is set by a switch, set the DR terminal (modem output) switch level to High.

When using a modem requiring DR terminal setting with software, write the command that turns ON the DR (DSR) signal into the data for initialization. Set the "DR signal valid/invalid designation for modem initialization" to "Invalid" in "modem function setting" with Engineering tool.

Specifications of and considerations for the connectable TAs (terminal adapters)

■TA specification

Item		Specification	Remarks
TA-to-TA communication specifications	Connection line	ISDN (INS net 64) equivalent, High-speed digital dedicated line	DSU and TA are required
	Initialization	Hayes AT command compatible	📖 MELSEC iQ-R Serial Communication Module User's Manual (Application)
	Communication standard	B-channel line exchange (V.110) D-channel packet exchange	—
	Electrical condition	V.28 compliant	
C24-to-TA communication specifications	Circuit definition	V.24 compliant	
	C24-side connector (RS-232)	D-sub 9 pin (female)	☞ Page 20 Transmission specification
	DR signal control*1	Capable of turning ON the DR(DSR) signal only	—
	Other	Compatible with C24 specification	☞ Page 20 Transmission specification ☞ Page 30 Transmission specifications

*1 TAs that turn ON the CD (DCD) signal simultaneously cannot be used.
Use a TA capable of flow control as described below also for the communication between the TA and terminal.
☞ Page 31 Modem specification
Flow control is a function of the TA itself that becomes available by issuing the AT commands to TA. Refer to the TA manual for details.

■Considerations for selecting a TA

• Configure the setting as shown below for a TA to be connected to the C24 side.

Setting item		Setting range
Communication rate		Depends on the TA in use
Modem command		Hayes AT command
SI/SO control		None
Communication method		Nonprocedural
Data format	Data bit	Match with C24*1, *2
	Stop bit	
	Parity bit	

*1 Some TAs may transmit one character as 10 bits.
Check the TA specifications when setting C24 transmission specifications.

*2 Some TAs may switch the communication rate following the start of data communication.
Since C24 cannot switch the communication rate, set the TA side so that its communication rate does not switch.

• When using a TA whose DR terminal (signal) is set by a switch, set the DR terminal (TA output) switch level to High.
When using a TA requiring DR terminal setting with software, write the command that turns ON the DR (DSR) signal into the data for initialization. Set the "Modem initialization DR (DSR) signal enable/disable designation" to "DR signal enabled" in the modem function setting with Engineering tool.

3 FUNCTION LIST

3.1 Function List

This section lists the functions of C24. For more details on the functions, refer to the following manual.

MELSEC iQ-R Serial Communication Module User's Manual (Application)

Basic functions

The following shows the basic functions of C24.

Function		Description
Communication with MC protocol	Reading/writing from/to device memory of CPU module	Performs batch read/write in bit/word units.
		Performs monitoring of device memory.
		Performs batch read/write of multiple blocks.
		Performs read/write by extension designation.
		Accesses other stations via network system.
	Reading/writing from/to the buffer memory of C24	Performs reading/writing from/to the buffer memory of C24.
	Reading/writing from/to the buffer memory of Intelligent function modules	Performs reading from/writing to the buffer memory of intelligent function modules.
	Reading/writing from/to program files and parameter files	Performs reading/writing from/to program files and parameter files stored in the CPU module.
	Controlling the status of the CPU module (such as remote RUN/STOP)	Performs status control of the CPU module. Performs remote RUN/STOP/PAUSE/latch clear/reset operations from target devices.
Communication with predefined protocol	Transmitting/receiving data	Performs data transmission/reception with the appropriate protocol for each target device. The protocol of the target device can be easily selected, or created/edited using the predefined protocol library of Engineering tool.
Communication with nonprocedural protocol	Transmitting/receiving data in any format	Data communication can be performed in any message format according to specifications of target devices (measuring devices, personal computers etc.).
Communication with bidirectional protocol	Transmitting/receiving data in any format	Any data transmission/reception can be performed with the message format and transmission control procedures for the bidirectional protocol.
Debug support function	Circuit trace	Traces transmitted/received data and communication control signal between C24 and target devices.
	Protocol execution log storage function	Checks the detailed execution status and results of the predefined protocol for each channel.

Additional functions

The following shows the additional functions of C24.

The abbreviations used in the following list are as follows:

MC: MC protocol

Non: Nonprocedural protocol

Bi: Bidirectional protocol

Pd: Predefined protocol

Function		Description	Protocol			
			MC	Non	Bi	Pd
Communication with ASCII code		Performs data communications with 2C/3C/4C frame.	○			
		Performs data communications with 1C frame.	○			
Communication with binary code		Performs data communication with 4C frame.	○			
Monitoring CPU modules (Programmable controller CPU monitoring function)		Monitors the operating status of CPU modules and the data in the device memory. The CPU module status and the device memory data can be transmitted to a target device at the fixed intervals, when an error occurs in the machine equipment, or when certain conditions are satisfied.	○	○		
Turning ON/OFF input signals for C24 from a target device (global function)		Turns ON/OFF input signals for C24 from a target device.	○			
Transmitting data from a CPU module to a target device (on-demand function)		Transmits data from a CPU module to a target device in each frame format of the MC protocol.	○			
Transmitting/receiving data with a user frame		Registers the fixed format portion of messages to be transmitted and received between C24 and a target device in the module, which can be used for data transmission/reception.	○	○		
Receiving data by interrupt programs		Reads the received data from a target device with interrupt programs so that the CPU module can receive data faster.		○	○	
Transmitting/receiving ASCII data with ASCII-binary conversion		Performs data communication with a target device with ASCII code data with ASCII-binary conversion by C24.		○	○	
Transmitting/receiving data by specifying transparent code		Transmits/receives one-byte data for transmission control of the target device side as a user data in data communications with a target device.		○	○	
Communication via public network, etc. (Modem function)		Performs data communication via public line with a remotely-located target device. Data communications using the MC protocol, nonprocedural protocol, and bidirectional protocol are available.	○	○	○	
Transmission control	DC code control (including Xon/Xoff control)	Notifies the availability of data reception on the host station and the effective range of transmitted/received data to target devices, using data for transmission control of C24.	○	○	○	○
	DTR/DSR control	Notifies the availability of data reception on the host station to target devices, using ER(DTR)/DR(DSR) signal of the RS-232 interface	○	○	○	○
Independent operation of each interface		Performs data communications with a target device without interconnecting the two interfaces of C24.	○	○	○	○
Interlink operation of each interface		Transmits all data received from either one of the two interfaces to the other interface.	○	○		
Parameter registration to CPU module		Configures the settings on the parameter setting screen of Engineering tool, writes the settings to the CPU module, and reflects the settings by restarting the CPU module.	○	○	○	○
Remote password check function		Checks the password with C24 when a remote user accesses to a CPU module using the modem function. This function prevents unauthorized accesses to the CPU module.	○			
Enabling or disabling echo back of the RS-422/485 interface		When data is transmitted through RS-485 (2 wire type) from the RS-422/485 interface, transmitted data is sent back to RDA or RDB on the host station. Whether to receive the returned data or not (discard) can be designated with this function.	○	○	○	○
Preventing erroneous noise signal reception		Prevents noise signal generated when turning ON the power of a target device or connecting a cable from being received in error by corresponding to the settings of data communication start/stop.	○	○	○	○
Automatically removing NULL characters in transmitted data		By removing automatically the NULL characters included in the data to be transmitted, man-hours for design can be reduced.		○	○	

Function	Description	Protocol			
		MC	Non	Bi	Pd
Dedicated instructions	A instruction to use the functions of the module.	○	○	○	○

3.2 Correspondence between Data Communication Functions and System Configurations

The following shows the system configurations that can use the data communication functions of C24.

For the system configuration that can be configured, refer to the following section.

☞ Page 41 SYSTEM CONFIGURATION

Communication with MC protocol

(○: Available, ×: Not available)

Function	System configuration (Target device: C24)			
	1:1	n:1	1:n	m:n
Reading/writing from/to device memory of CPU module	○	○	○	○
Reading/writing from/to the buffer memory of C24	○	○	○	○
Reading/writing from/to the buffer memory of Intelligent function modules	○	○	○	○
Reading/writing programs and parameters	○	○	○	○
Controlling the status of the CPU module (Remote RUN, STOP, etc.)	○	○	○	○
Communication with ASCII code	○	○	○	○
Communication with binary code	○	○	○	○
On-demand function	○	×	×	×
Global function	○	○	○	○
Programmable controller CPU monitoring function	○	×	×	×

Communication with predefined protocol

(○: Available, ×: Not available)

Function	System configuration (Target device: C24)			
	1:1	n:1	1:n	m:n
Transmitting/receiving data	○	○	×	×

Communication with nonprocedural protocol

(○: Available, ×: Not available)

Function	System configuration (Target device: C24)			
	1:1	n:1	1:n	m:n
Transmitting/receiving data in any format	○	○	○	○
Transmitting/receiving data with a user frame	○	○	○	○
Programmable controller CPU monitoring function	○	×	×	×
Reading received data by interrupt programs	○	○	○	○
Transmitting/receiving ASCII data with ASCII-binary conversion	○	○	○	○
Transmitting/receiving data by specifying transparent code	○	○	○	○

Communication with bidirectional protocol

(○: Available, ×: Not available)

Function	System configuration (Target device: C24)			
	1:1	n:1	1:n	m:n
Transmitting/receiving data in any format	○	×	×	×
Reading received data by interrupt programs	○	×	×	×
Transmitting/receiving ASCII data with ASCII-binary conversion	○	×	×	×
Transmitting/receiving data by specifying transparent code	○	×	×	×

Precautions

In general, when data is communicated in the system configuration of other than 1:1 basis, pay attention to the following.

- Avoid simultaneous transmission.
- Read and discard the received data excluding the one addressed to the host station.

4 PROCEDURES UP TO OPERATION

This chapter explains the procedures up to operation.

1. Mounting a module.

Mount C24 with desired configuration.

☞ Page 41 SYSTEM CONFIGURATION

2. Wiring

Connect C24 and target devices with a cable.

☞ Page 44 WIRING

3. Setting parameters

Set the C24 parameter with the basic settings using Engineering tool.

MELSEC iQ-R Serial Communication Module User's Manual (Application)

4. Communication using each protocol

- MC protocol communication
- Predefined protocol communication
- Nonprocedural protocol communication
- Bidirectional protocol communication

MELSEC iQ-R Serial Communication Module User's Manual (Application)

5. Using special function

- Set the C24 parameter with the application settings using Engineering tool.
- Communicate using the special functions.

MELSEC iQ-R Serial Communication Module User's Manual (Application)

MEMO

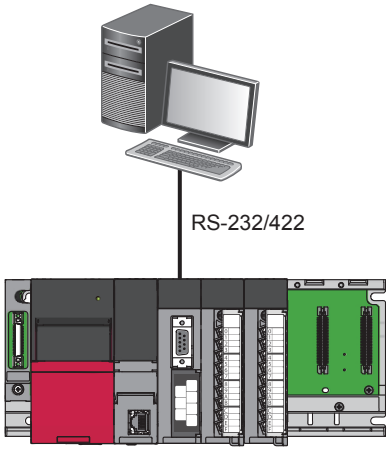
5 SYSTEM CONFIGURATION

This chapter explains the system configuration of C24.

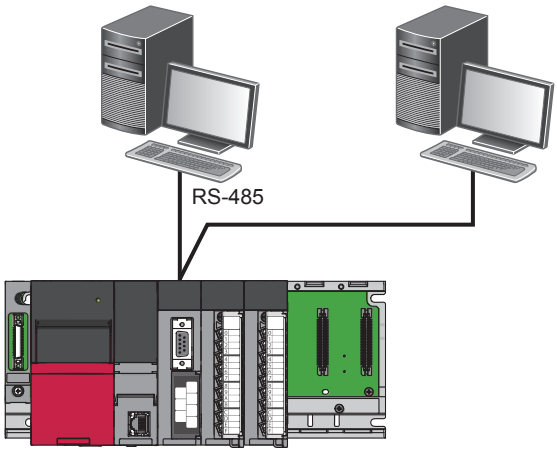
5.1 System Configuration

System configurations (combinations of C24 and target devices) for data communication are shown below.

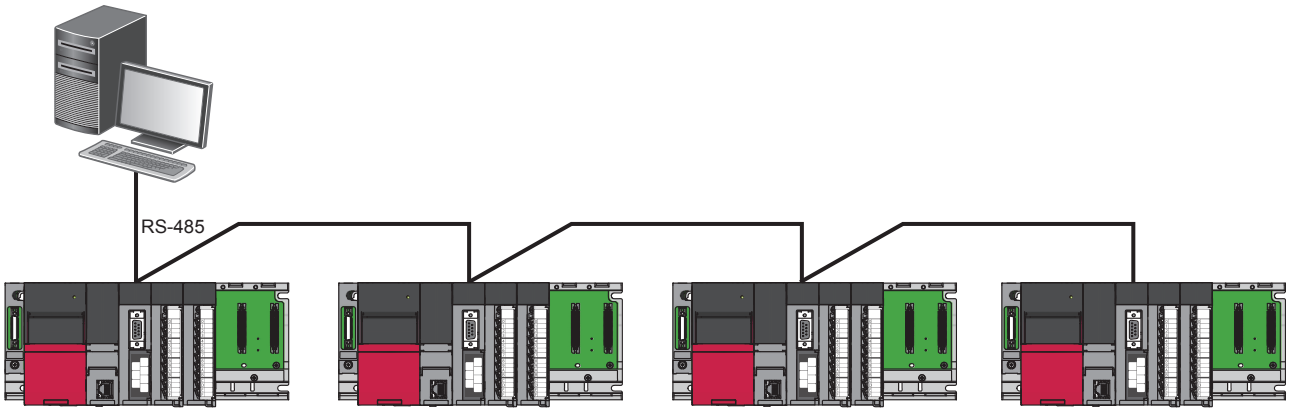
System configuration on a 1:1 basis between target device and C24

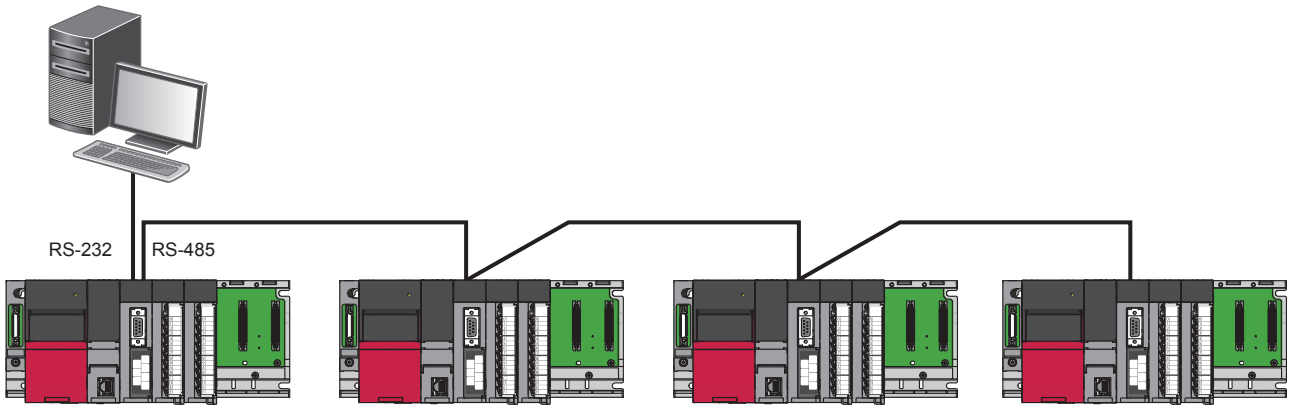


System configuration on a n:1 basis between target device and C24

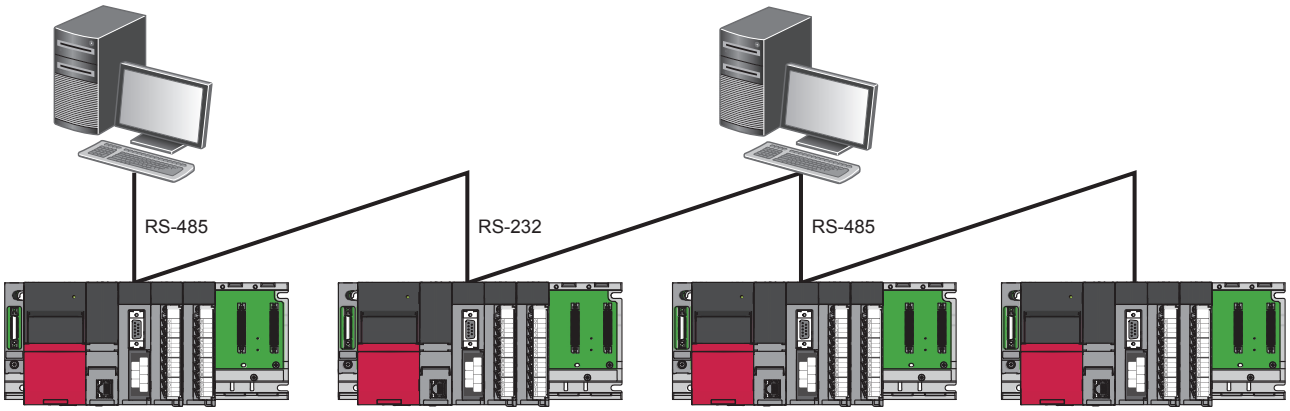


System configuration on a 1:n basis between target device and C24





System configuration on a m:n basis between target device and C24



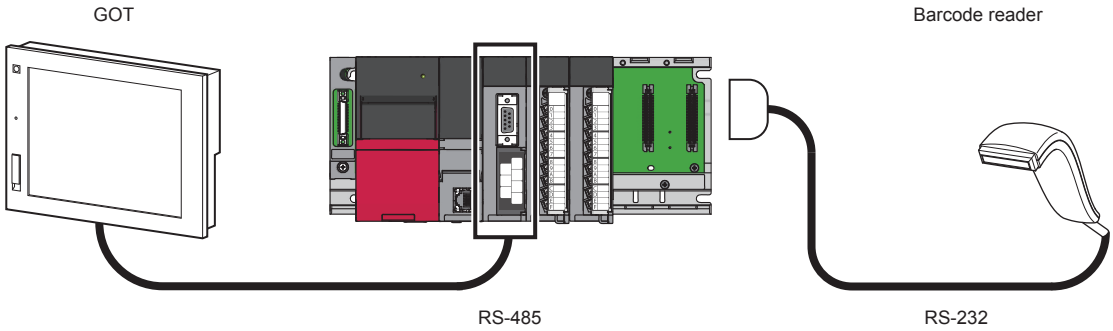
5.2 System Example that can be Constructed

The following shows examples of system configuration for C24.

Connecting two target devices to C24

Connect target devices such as GOT and barcode reader to a single C24.

Data can be sent and received between GOT and barcode reader via C24.



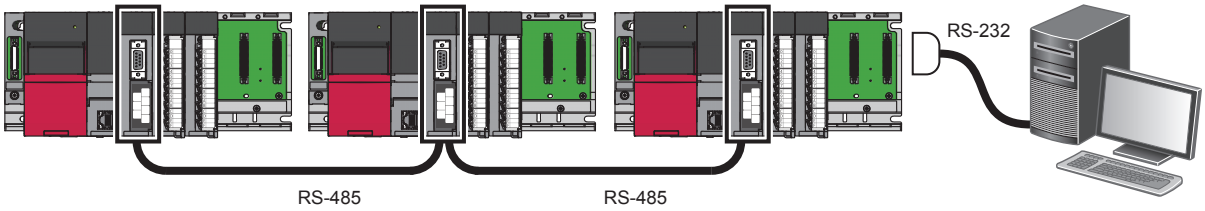
Connecting a target device and more than one C24

Connect more than one C24 to a personal computer as the multidrop connection.

Data can be read from/written to the CPU module from a personal computer via C24.

For the combination of target devices and C24, refer to the following section.

☞ Page 41 System Configuration



6 WIRING

This chapter explains the wiring methods in the system using C24.

6.1 RS-232 Interface Connection Method (For Full-Duplex Communications)

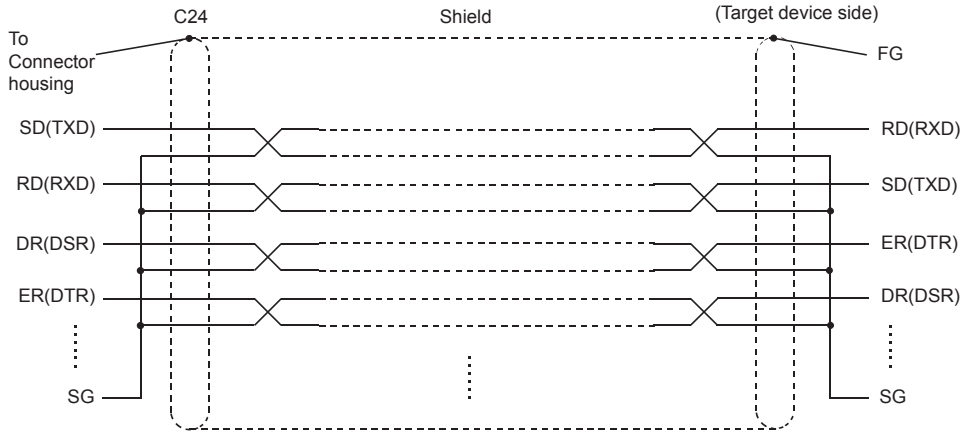
This section shows considerations for connection and connection examples for full-duplex communications using C24 RS-232 interface.

Considerations for connection

- Do not bundle control line and communication cable with the main circuit and the power cables, and do not install them close to each other.
  Keep a distance of 100 mm (3.94 in.) or more between them. Failure to do so may result in malfunction due to noise.
- Prior to connection to the target device side, check the specifications of the target device.
- Be sure the shield is single-point grounded.
- For more information for the following, refer to the relevant sections. (MELSEC iQ-R Serial Communication Module User's Manual (Application))
  Controlling communication on the C24 side at the target device side by using the CD(DCD) signal on RS-232 interface.
  Performing half-duplex communications with the specifications of the target device side.
  Using the modem function.
- Connect the FG signal of the connection cable and the shield as follows:

Connection cable	Connection on the C24 side	Remarks
FG signal of connection cable	Connect to C24 connector housing	Do not short-circuit the FG and SG signals of the connection cable. When the FG and SG signals are connected inside the target device, do not connect the FG signal to the C24 side.
Shield of connection cable	Connect to the FG terminal of the target device or the C24 connector housing	

- When normal data communication is not obtained due to external noise, perform the wiring as follows:
  Connect the FG terminal on the target device to the C24 side using the shield of the connection cable.
  Connect the signals other than SG to the SG signal with twisted pair cables.

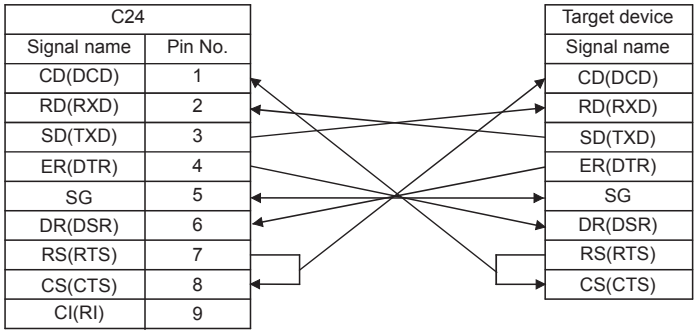


- Tighten the connector screws within the following torque ranges.

Location of screw	Tightening torque range	Remarks
RS-232 cable connector screw (M2.6 screw)	0.20 to 0.39N·m	Depth of hole: L = 3.2 mm (0.13 in.) or less (Internal length from the surface)

Connection examples

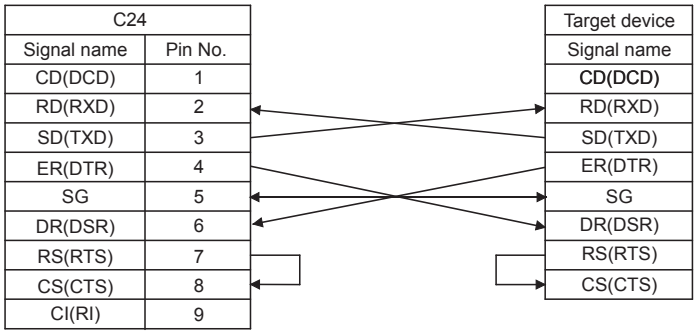
With target device capable of turning ON/OFF the CD(DCD) signal (Pin No.1)



- Configure the CD terminal check designation according to the specification of the target device.
  DTR/DSR control or DC code control is available with the wiring shown above.

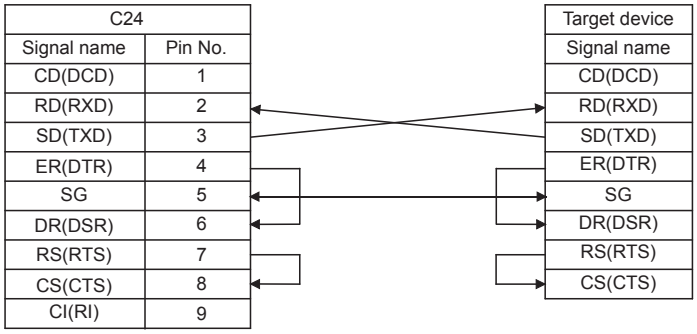
With target device not capable of turning ON/OFF the CD(DCD) signal (Pin No.1)

■Connection example 1



- With the wiring shown above, DTR/DSR control or DC code control is available.

■Connection example 2



- With the wiring shown above, DC code control is available.

Point

If the CPU module and the target device cannot be communicated at all, try to perform data communication with the wiring connection shown in the connection example 2 as a connection test.
When data can be communicated with the wiring connection shown in the connection example 2, rewire after checking the interface specifications of the target device side.

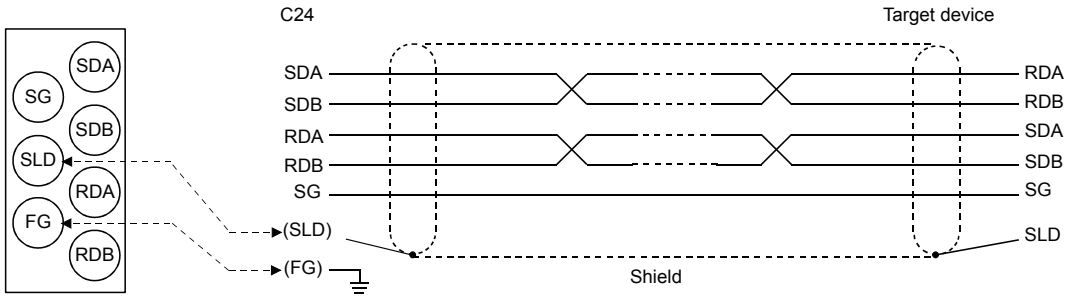
6.2 RS-422/485 Interface Connection Method

This section shows considerations for connection and connection examples when using C24 RS-422/485 interface.

Considerations for connection

- Do not bundle control line and communication cable with the main circuit and the power cables, and do not install them close to each other.
  Keep a distance of 100 mm (3.94 in.) or more between them. Failure to do so may result in malfunction due to noise.
- M3 screws are used for the terminal screw on RS-422/485 terminal block. Use 1.25-3 as the applicable solderless terminal.
  Solderless terminals with insulation sleeves cannot be used for the terminal block.
  Covering the wire connection parts of the solderless terminals with mark tubes or insulation tubes is recommended.
- When connecting the C24 SG and FG signals to the target device, connect them according to the specifications of the target device.
- Be sure the shield is single-point grounded.
- If data is not communicated normally due to external noise even if the shield of the connection cable is wired, perform wiring as follows:
  Connect the FG of both station with the shield of the connection cable. However, connect to the target device side according to the instruction manual of the target device. Use the plate terminal (supplied with the product) to connect the braided shield wire of connection cable to RJ71C24-R4. Connect (FG) of the C24 side to the FG terminal on the power module with the C24 or the FG terminal on the control panel to which the programmable controller with the C24 is installed.
  Connect each nnA and each nnB with a twisted pair cable.
  The 'nn' will be SD or RD, and combine as described below according to the configuration.

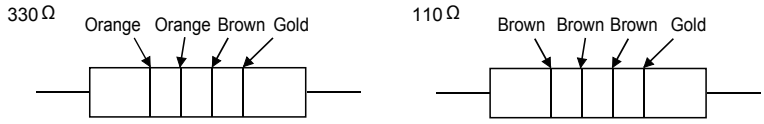
Connection configuration	Combination for connection
Connect a target device to C24 on a 1:n basis	Connect SDA and RDA, and SDB and RDB of each signal on the connection cable respectively.
Connect a target device to C24 on a n:1 basis	Connect SDA and SDA, and RDB and RDB of each signal on the connection cable respectively.



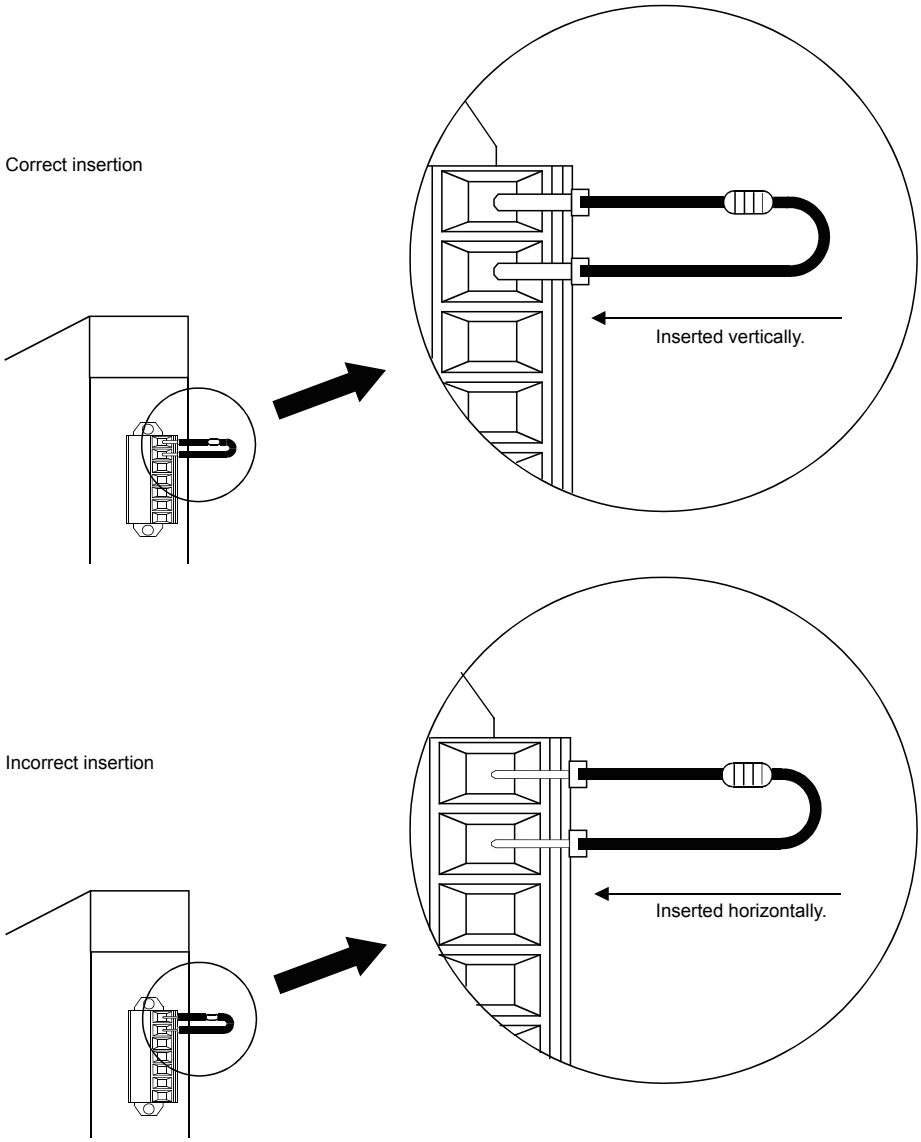
Correspondence of the RS-422/485 terminal block and signal position

- Terminating resistors must be set (or connected) for both terminal stations on the line. On the C24 side, connect the terminating resistor (supplied with C24) according to the specifications of the target device.
  On the target device side, connect or set a terminating resistor according to the instruction manual of the target device.
  Connect the terminating resistor*1 connected to the C24 side as follows:
  Connect a '330Ω1/4W' terminating resistor for RS-422 communication. Connect a '110Ω1/2W' terminating resistor for RS-485 communication.

*1 How to differentiate between terminating resistors



- When connecting a terminating resistor of the RJ71C24-R4 to the RS-422/485 plug-in terminal block, insert the terminating resistor in the direction shown below.



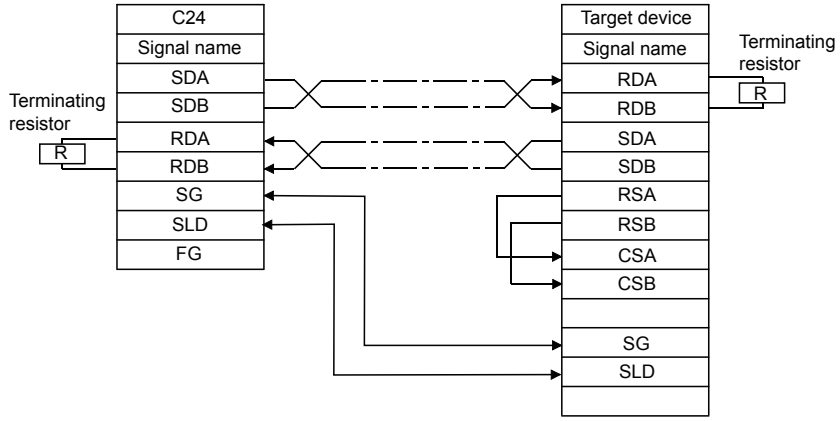
- If data cannot be communicated with the target device at all, check the polarity of the target device. If the polarities of C24 and the target device do not match, reverse the polarity of each signal on either device side and connect the devices with the cable so that the data may be communicated.
- In the description for setting/connection of terminating resistor in this section, when using an RS-232 to RS-422 converter on the device sides, which are both terminal stations on the line, Setting/connection of terminating resistors is required at the converter side.
- When using an RS-232 to RS-422 converter to connect the target device and C24, use a converter that supports the system configuration between the target device and the CPU module (1:1, 1:n, m:n).
- Unify the devices to be connected to C24 RS-422/485 interface (including connections on a 1:n, n:1, and m:n basis) to either RS-422 or RS-485
- Tighten the screws such as terminal block screws within the following torque ranges.

Location of screw	Tightening torque range
Terminal screw for RS-422/485 terminal block (M3 screw)	0.42 to 0.58N·m
RS-422/485 terminal block mounting screws (M3.5 screw)*1	0.66 to 0.89N·m
RS-422/485 plug-in terminal block terminal screw (M2 screw) for RJ71C24-R4.	0.20 to 0.25N·m

*1 RS-422/485 terminal block mounting screw for QJ71C24, Q series C24 can be used.
However, RS-422/485 terminal block mounting screw for RJ71C24 cannot be used for Q series C24.

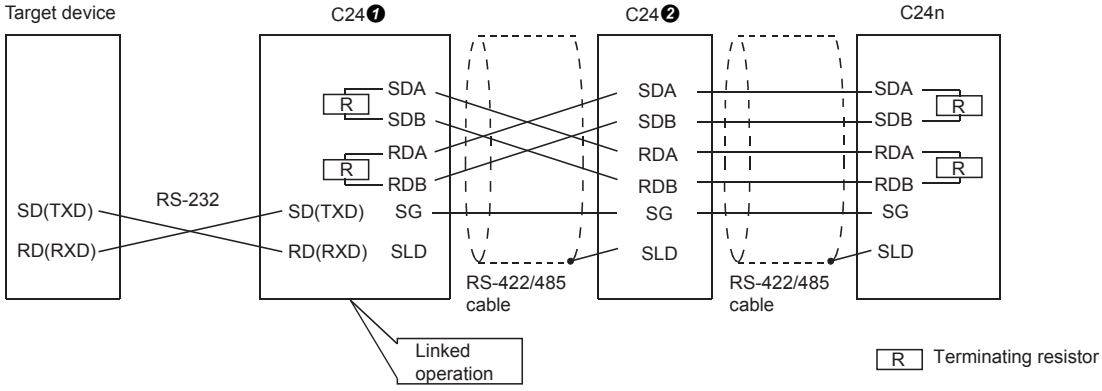
Connection examples

Connecting a target device to C24 on a 1:1 basis

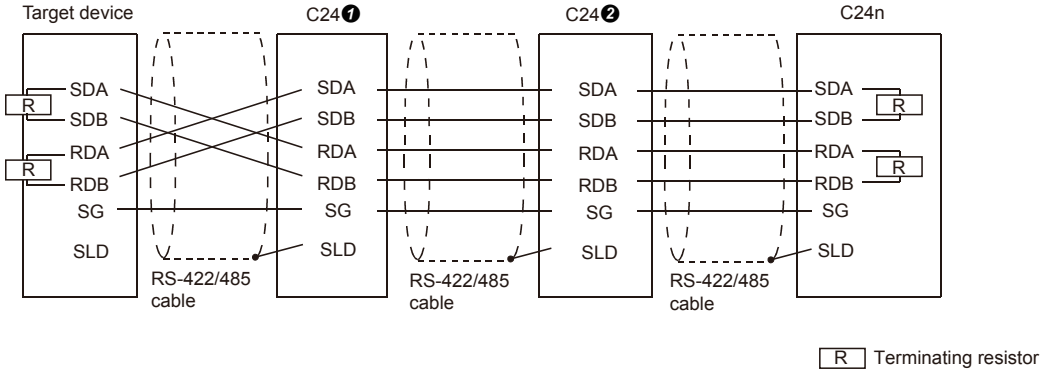


Connecting a target device to C24 on a 1:n basis (multidrop connection)

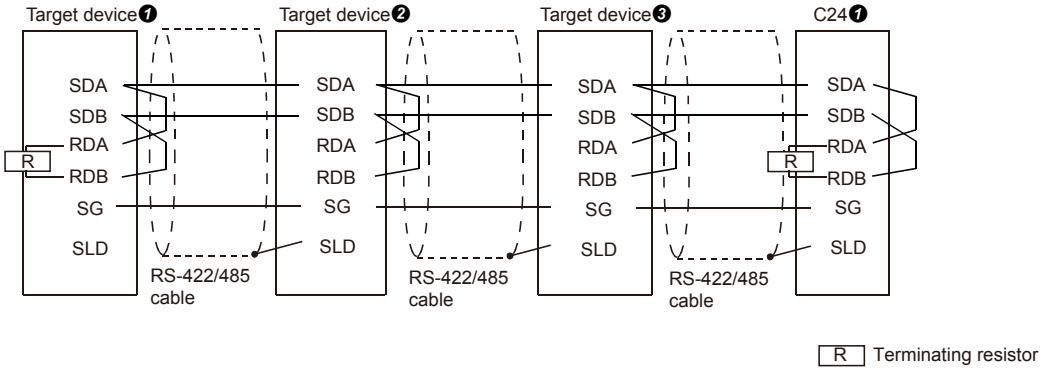
■Connection example 1



■Connection example 2

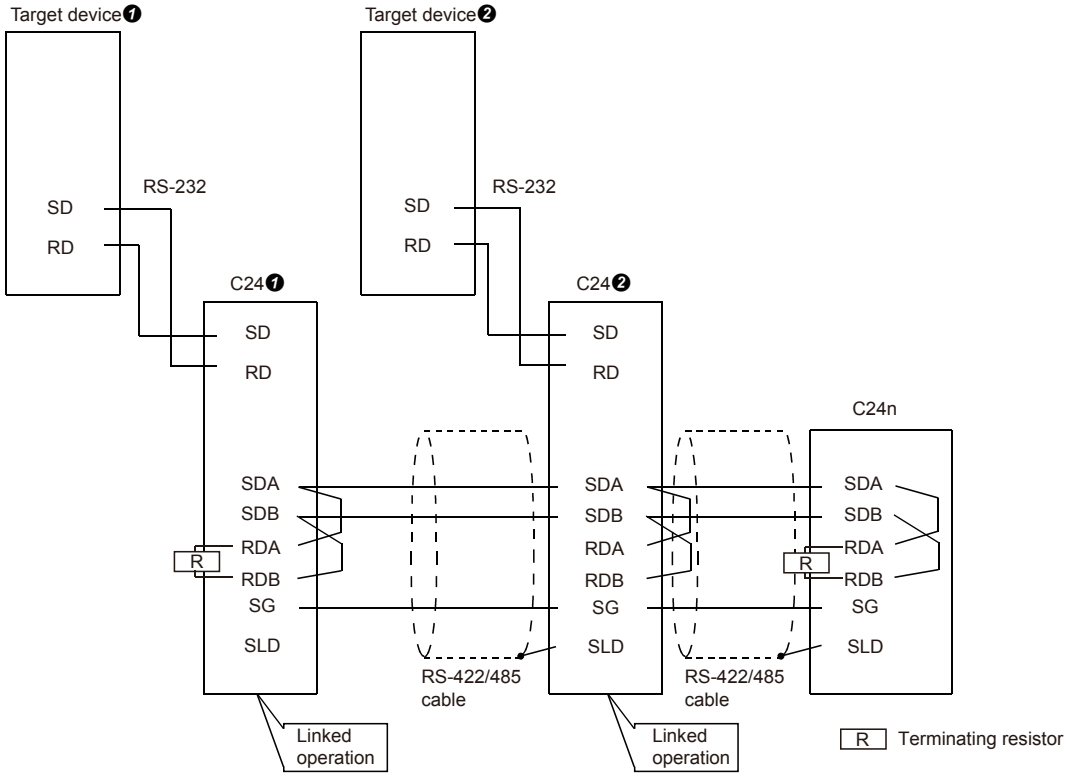


Connecting a target device to C24 on a n:1 basis (multidrop connection)

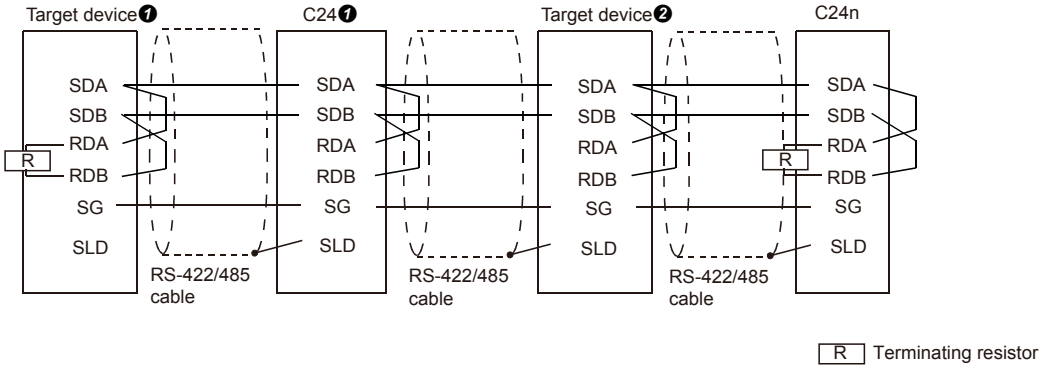


Connecting a target device to C24 on a m:n basis (multidrop connection)

■Connection example 1



■Connection example 2



7 DATA COMMUNICATION USING PREDEFINED PROTOCOLS

This chapter explains the example of data communication using communication protocol.

7.1 Program Example

The following shows the program example and setting examples of the Predefined protocol function.

Setting programs

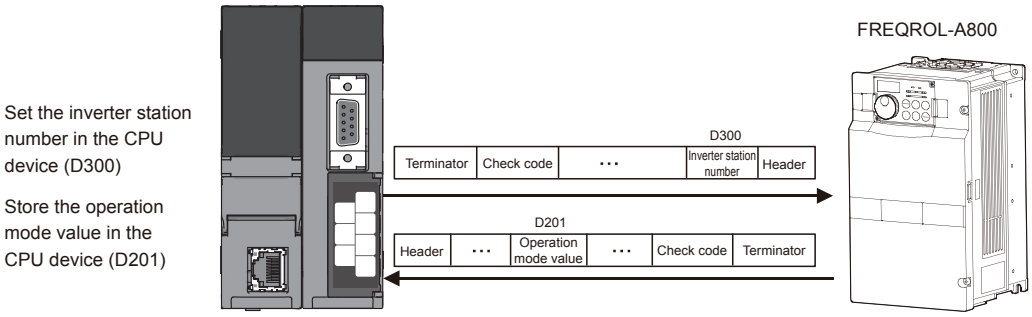
The predefined protocol support functions of an Engineering tool is used for the settings.
Mitsubishi inverter FREQROL-A800 (described as inverter or A800 hereafter) is used for a connection target device of C24 in this setting example.

System configuration/wiring

The C24 to be used in the following example is mounted on the slot 0 on the base unit, and connected to the external device on a 1:1 basis via RS-422/485 line using CH2.
For details on the system configuration/wiring, refer to the following manual.
☞ Page 41 SYSTEM CONFIGURATION
☞ Page 44 WIRING

Target device and protocol

Connect the C24 and the inverter, and read the operation mode values of the inverter.
Set the inverter station number to CPU device (D300) and send it, and store the operation mode value in CPU device (D201).



Manufacturer	Mitsubishi Electric
Device name	FREQROL-A800
Protocol name	H7B:RD Operation Mode

Storage target devices and buffer memory assignment

Specify the CPU device and buffer memory in the data storage areas, and transmit/receive data.

Packet name	Element Name	Packet Type	Data storage area specification
H7B:RD Operation Mode	Inverter Station Number	Send packet	D300
NOR:RD Data (4 Digits Data)	Inverter Station Number	Receive packet	D200
	Read Data		D201
ERR:NAK Response	Inverter Station Number		D202
	Error Code		D203

Communication settings (Engineering tool)

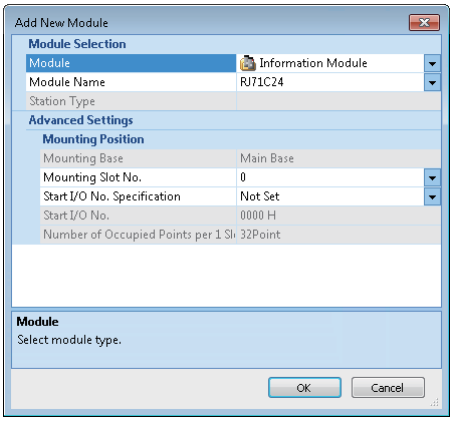
This section explains the settings required for performing the predefined protocol communication on Engineering tool.

■Adding new modules

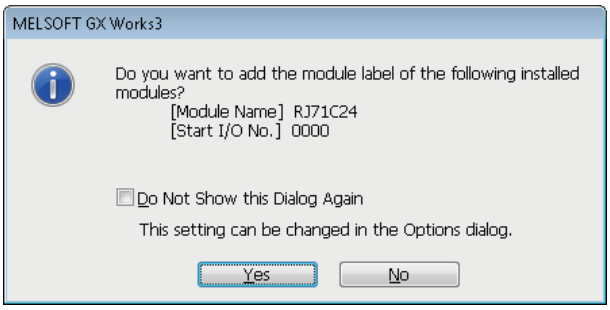
Add an Intelligent function module to the project and set the details.

Operating procedure

1. Select [Parameter] on Navigation window ⇨[Module Information], and right click⇨[Add New Module].
2. Select "Information Module" in "Module Type", and select "RJ71C24" in "Module Name" on the "Add New Module" screen.



3. Click the [Yes] button on the screen shown below, and add the module label for C24.


MELSOFT GX Works3
Do you want to add the module label of the following installed modules?
[Module Name] RJ71C24
[Start I/O No.] 0000
Do Not Show this Dialog Again
This setting can be changed in the Options dialog.
Yes
No

■Setting module parameter

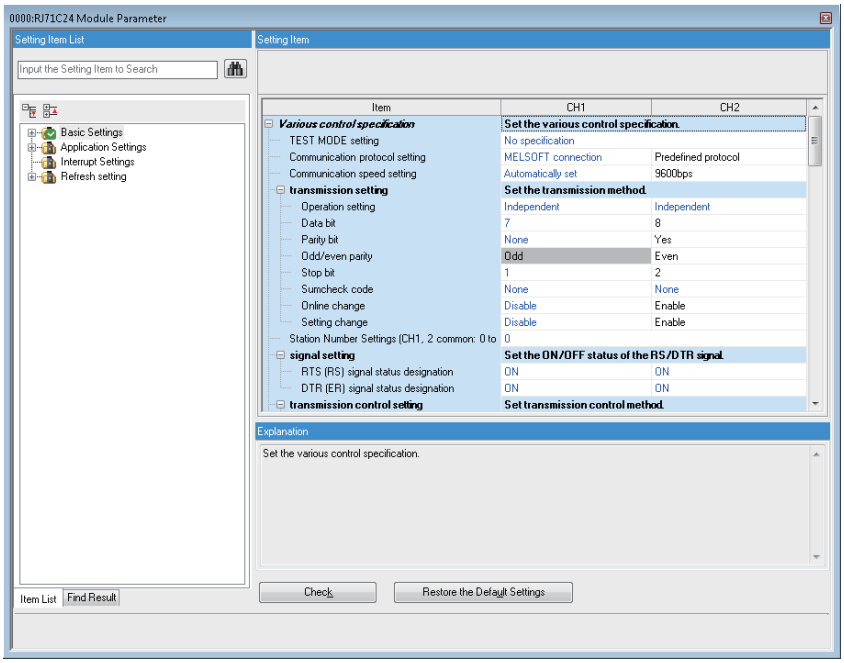
Set [Various control specification] of module parameter as follows:

For details on the parameters, refer to the following section.

MELSEC iQ-R Serial Communication Module User's Manual (Application)

Window

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Module Name ⇨ [Module Parameter] ⇨ "Basic Settings" ⇨ "Various control specification"



Setting data

Item		Description
Test mode setting		0: No specification
Communication protocol setting		Predefined protocol
Communication speed setting		9600bps
Transmission setting	Operation setting	Independent
	Data bit	8
	Parity bit	Yes
	Odd/even parity	Even
	Stop bit	2
	Sum check code	None
	Online Change	Enable
	Setting change	Enable
Signal setting	RTS (RS) signal status designation	ON
	DTR (ER) signal status designation	ON

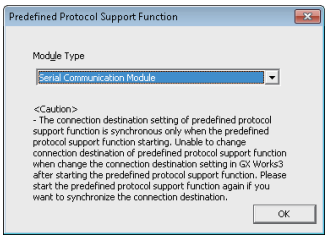
■Setting Predefined protocol support function

For details for setting the Predefined protocol support functions, refer to the following section.

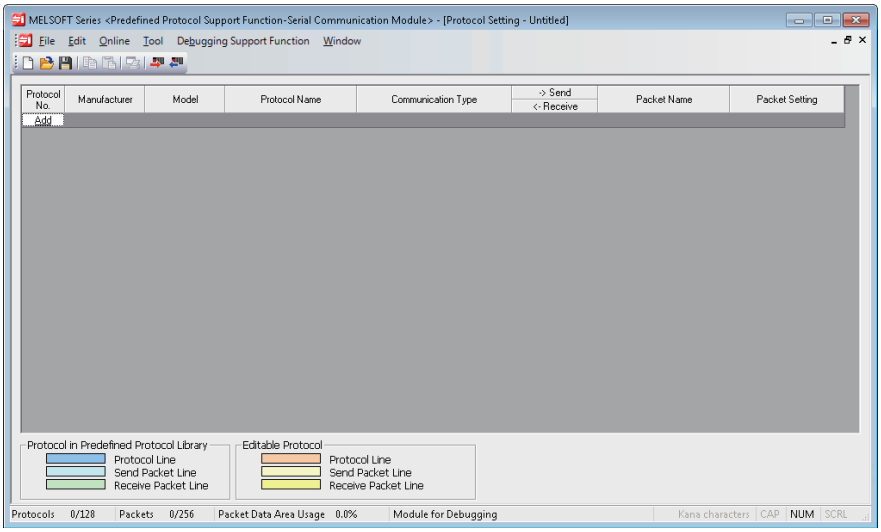
MELSEC iQ-R Serial Communication Module User's Manual (Application)

Operating procedure

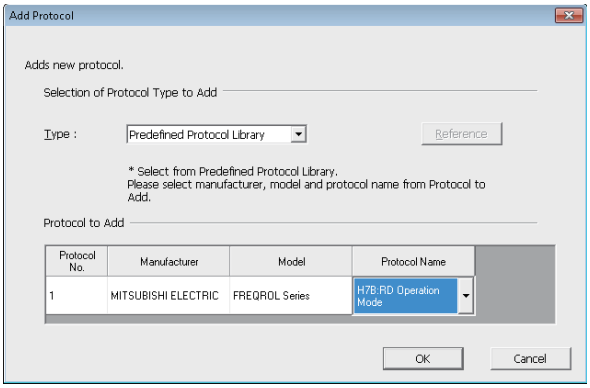
1. Select [Tool]⇨[Predefined Protocol Support Function] from an Engineering tool.
2. Select "Serial Communication Module" in "Module Type" on the "Predefined Protocol Support Function" screen.


Predefined Protocol Support Function
Module Type
Serial Communication Module
<Caution>
- The connection destination setting of predefined protocol support function is synchronous only when the predefined protocol support function starting. Unable to change connection destination of predefined protocol support function when change the connection destination setting in GX Works3 after starting the predefined protocol support function. Please start the predefined protocol support function again if you want to synchronize the connection destination.
OK

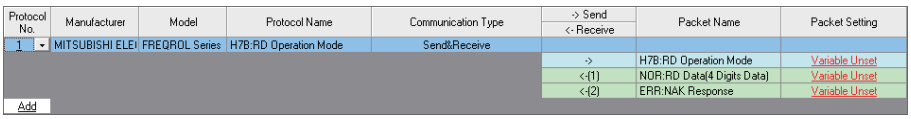
3. Select [File]⇨ [New] on the "Predefined Protocol Support Function" screen.



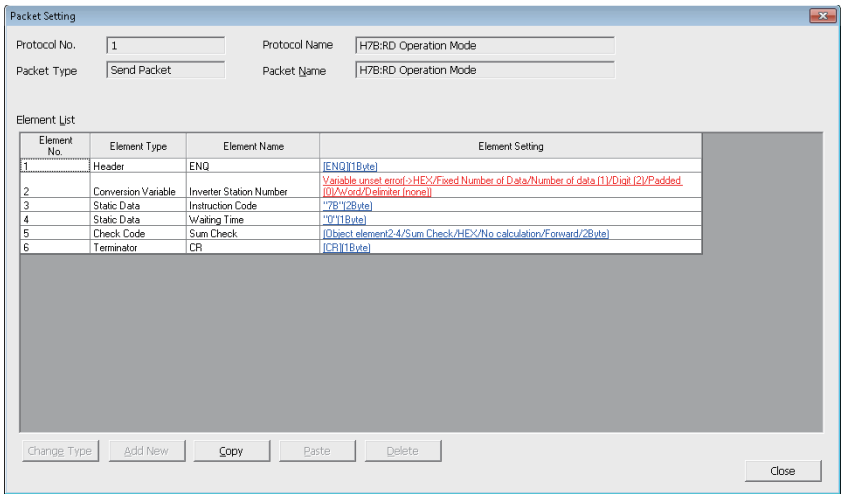
4. Select [Edit]⇨[Add Protocol] on the "Protocol Setting" screen.
5. Select "Predefined Protocol Library" in "Type" on the "Add Protocol" screen, and select the protocol to be used in "Protocol to Add".



6. Click the "Variable Unset" cell of "Packet Setting" screen on the "Protocol Setting" screen.



7. Click the "Variable unset error" cell on the "Packet Setting" screen



8. Enter 'D300' to "Send Data Storage Area" on the "Element Setting" screen.

9. Set the packet settings in the "Variable Unset" cell of "Packet Setting" on the "Protocol Setting" screen with the same procedure (from step 5 to step 8).

Set the following values for the data storage area.

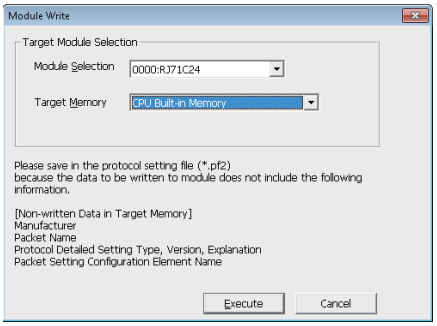
Packet name	Element number	Element name	Data storage area specification
NOR:RD Data(4 Digits Data)	2	Inverter Station Number	Set 'D200'
	3	Read Data	Set 'D201'
ERR:NAK Response	2	Inverter Station Number	Set 'D202'
	3	Error Code	Set 'D203'

Writing data to module

Write the packet after confirming if the CPU module is in 'STOP' status.

Operating procedure

1. Select [Online]⇨ [Write to Module] from Engineering tool.
2. Select "CPU Built-in Memory" in "Target Memory" on the "Write to Module" screen, and click the [Execute] button.



Executing protocols

Operating procedure

1. Create a program using a CPRTCL instruction with an Engineering tool
2. Switch the CPU to "RUN", and execute the registered protocol with CPRTCL instruction.

Program in which the CPRTCL instruction is used

Receive data is stored to the receive data storage area that is set to the receive packet.

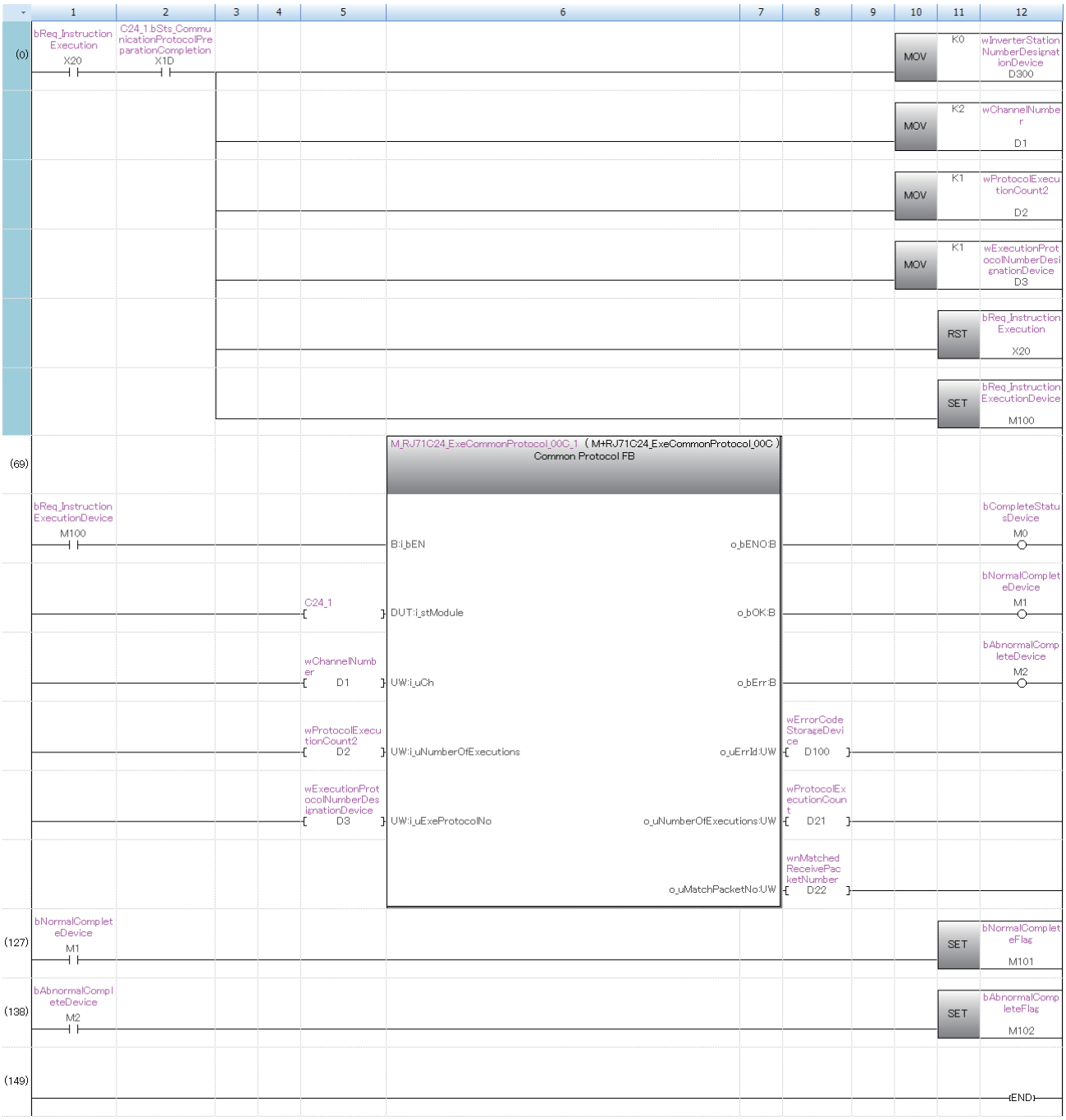
For details on the CPRTCL instruction, refer to the dedicated instruction. (MELSEC iQ-R Programming Manual (Instructions, Standard Functions/Function Blocks)))

Classification	Label name	Description	Device
Module label	C24_1	Target module	—
	C24_1.bSts_CommunicationProtocolPreparationCompletion	Predefined protocol ready	X1D
Label to be defined	Define the global label as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
1	bReq_InstructionExecution	Bit	...	VAR_GLOBAL	X20
2	wInverterStationNumberDesignationDevice	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D300
3	wExecutionProtocolNumberDesignationDevice	Word [Unsigned]/Bit String [16-bit][0..7]	...	VAR_GLOBAL	D3
4	bCompleteStatusDevice	Bit	...	VAR_GLOBAL	M0
5	wChannelNumber	Word [Signed]	...	VAR_GLOBAL	D1
6	wProtocolExecutionCount	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D21
7	bAbnormalCompleteDevice	Bit	...	VAR_GLOBAL	M2
8	bNormalCompleteDevice	Bit	...	VAR_GLOBAL	M1
9	bReq_InstructionExecutionDevice	Bit	...	VAR_GLOBAL	M100
10	bNormalCompleteFlag	Bit	...	VAR_GLOBAL	M101
11	bAbnormalCompleteFlag	Bit	...	VAR_GLOBAL	M102
12	wErrorCodeStorageDevice	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D100
13	wProtocolExecutionCount2	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D2
14	wnMatchedReceivePacketNumber	Word [Unsigned]/Bit String [16-bit][0..7]	...	VAR_GLOBAL	D22

For information on the module FB to be used, refer to the following manual.

MELSEC iQ-R Serial Communication Module Function Block Reference



(0) Store the setting value to the transmission data storage area.
Set the channel number.
Set the protocol number 1.
Direct the protocol execution.

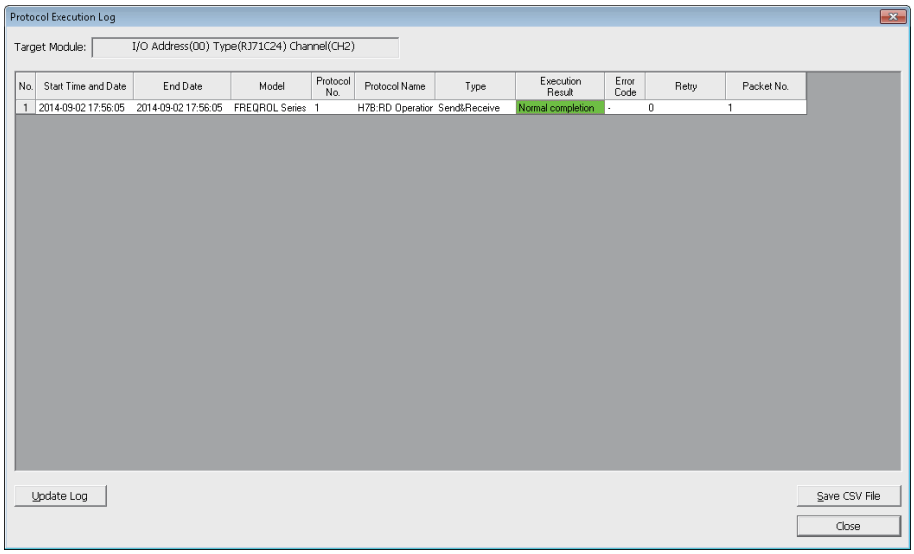
(127) Turn the normal flag ON.

(138) Turn the abnormal flag ON.

Checking protocol execution result

■Check on the "Protocol Execution Log" screen.

[Debugging Support Function] on the "Protocol Setting" screen ⇨[Protocol Execution Log]



Point

The logs displayed in the "Protocol Execution Log" screen can be selected from the following according to the log registration condition.

- Display only the failed protocols.
- Display all execution statuses and execution logs.

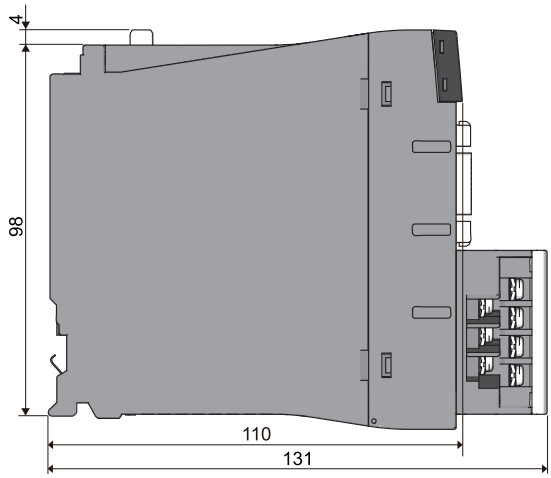
For details of the selecting method of the log registration condition, refer to the following section.

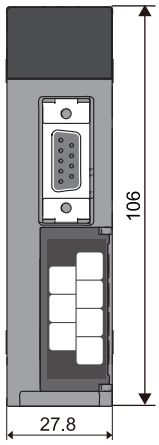
MELSEC iQ-R Serial Communication Module User's Manual (Application)

APPENDIX

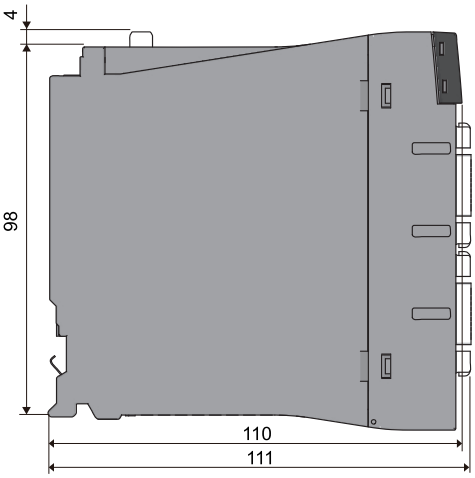
Appendix 1 External Dimensions

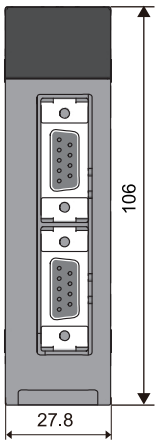
RJ71C24



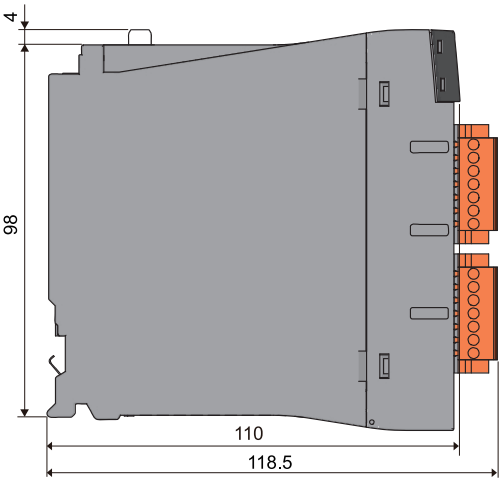


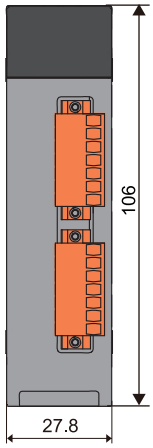
RJ71C24-R2





RJ71C24-R4





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REVISIONS

*The manual number is given on the bottom left of the back cover.

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MODEL CODE: 13JX08

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